

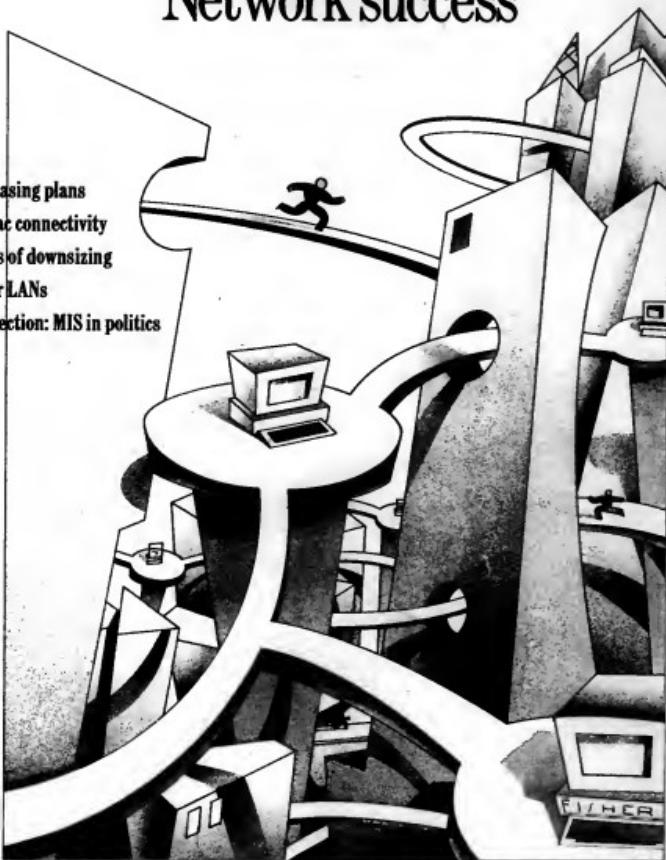
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in focus

BUYING TIME 1989 is only months away. With budgets approved, MIS managers everywhere are planning either to buy, upgrade, lease or all of the above. Whatever their mandate for the next year, these professionals are hungry for information to make informed decisions. Where do they go? To the glitz of Las Vegas and Comdex? To the niche shows? To the vendors? Get the latest from MIS managers on their purchasing plans and where they prefer to do business. By Helen Pike. *Page 14.*

MICRO MELTING POT The PC LAN market is maturing, driven by the changing face of corporate computing. Companies are striving to seamlessly connect the enterprise, regardless of the desktop platform. PC-only and Mac-only networks are becoming things of the past, as PC LAN vendors concentrate their efforts on uniting the two camps. Find out who's winning in this growing market. By Nina Burns. *Page 19.*

The dynamics of downsizing

By Stan Kolodziej. Is there anyone out there crazy enough to trash his venerable mainframe in favor of networked PCs? You bet. For some in MIS, the economic lure of the low processing and maintenance costs associated with personal computers makes this setup irresistible. Read about those certain MIS managers that didn't resist (and lived to tell about it). *Page 29.*

Backdoor LANs

By Marc Cuccere. LANs are proliferating, and MIS may be losing control. That's the ominous observation our author makes. But he also admits that things don't have to be that bleak. There are steps you can take to avoid this scenario by learning how to manage unsanctioned networks. *Page 31.*

Science projects

By Stan Kolodziej. A number of the industry's best and brightest network technologies have come out of our colleges and universities. By shifting product development to this environment, vendors have the chance to experiment with fewer repercussions from the commercial sector. This article explores the mutually beneficial relationship between the world of academia and business. *Page 35.*



MIS' political voice

This month, the Democrats and Republicans will duke it out over who will be president. Many of us will vote, and that's about as close as we'll come to being politically active. But for others, it doesn't end there. Energized by the issues, some people get personally involved. Our Special Section looks at such people in the MIS community and how they are lobbying to get MIS' voice heard. *Page 23.*

From the Editor

Including a reader survey on integration. *Page 5.*

Manager's Corner

Jim Young on infiltrators making their way into the MIS department. *Page 6.*

News & Analysis

The surge in laptop machines; Candy maker Heath's suit against AT&T; RPG-II on the PS/2; the bus wars; Steven Jobs' Next machine. *Page 8.*

Products

Tech Talk examines the EISA effort; DEC strengthens its IBM ties; IBM announces Netview release; Telebit, Data Race offer modems. *Page 37.*

Blue Beat

Brian Jeffery on the truth about IBM peer-to-peer networking. *Page 37.*

Calendar

Industry events. *Page 38.*

The Insider

Michael Millikin on the window of opportunity in PC connectivity. *Page 40.*

Log Off

The Boston Computer Exchange's recent prices for used microcomputers. *Page 40.*

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VIEWPOINT

MANAGER'S
CORNER

In the hands of laymen

Jim Young



Throughout is fair play — that is, unless you are the one turned upon.

For a long time, MIS recommended a strategy of spreading technology called the Trojan horse method. In this strategy, users are sensitized to the wonders of computer systems by permanently putting a true believer from the MIS department into the group to work among them.

But because of our typical self-entitled attitude, we in MIS may have failed to notice that the tables are being turned on us; we are becoming the target of infiltration from other areas of business.

There are not many MIS jobs in which business professionals without technical backgrounds can fit in. However, with the sim-

plication of some MIS disciplines, these opportunities are growing. As users become acquainted with certain aspects of technology, their ability to enter the MIS department becomes ever more possible. In many organizations today, there is emerging evidence of user movement into information centers, data administration, office automation, and even the hollow halls of systems and programming, thanks to the use of simplifying computer-aided software engineering technologies.

It hits home

Nowhere is this trend more significant than within MIS management positions.

A recent inventory of top industry chief information officers revealed a surprising number with little or no background in MIS. Even low-level management positions are occasionally

filled by someone who did not come up through the ranks.

While not commonplace, this situation seems to be becoming more prevalent. As companies place more emphasis on pure management skills within MIS, the transfer of known talent from unrelated areas becomes a more likely option. The aspiring MIS professional may want to examine the implications of this practice.

The user coming into the MIS department is by no means a recent phenomenon. Business analysts typically came from other departments in the days when data processing technicians were not known to respond to user needs with a great deal of understanding.

Years ago, MIS departments were turned over to managers who lacked MIS experience. However, this decision was usually an act of management desperation. Moreover, these instances were caretaker jobs, and no one expected the manager to actually do anything with the department.

It is important to remember that when this user invasion occurred, our profession viewed it as a warning practice that the growing and more fully rounded skills of MIS would eliminate forever.

We were wrong. The continued user colonization could be taken as a great insult by MIS. When someone who has mastered his craft within MIS is overlooked for an important new MIS position, the initial reaction is to behave petulantly, rail against the "amateurs" and feel betrayed.

But none of these are appropriate responses, because they accomplish nothing constructive. A far better practice in such cases is to do a little soul-searching. What will we do?

• Share blame. When company executives feel that they have to look elsewhere for management and other talent for the MIS department, it is time to blame ourselves. Management skills, while perhaps not obvious, are within the grasp of today's MIS professionals. The success of many chief information officers attests to this fact. And it is not as if we have been given insufficient time in which to develop such skills.

In instances in which all the right skills are in place within the MIS area and talent is still imported, we should nonetheless accept the blame, this time for being poor communicators. It is up to us to convince top management of how we can improve our organizations. We cannot stop merely being capable of delivering on these commitments.

• A whole new ballgame. We owe it to ourselves to see the expanse of users entering the MIS department just as our profes-

sions enter their departments. It is quite likely that the days of vertical progression through an organization are ending, replaced by careers designed to broaden organizational understanding. If this becomes true, it is inevitable that non-MIS types will become more prevalent in our ranks.

Our response should be to participate more aggressively in these organizational "exchange programs." We should cultivate increased quantities, greater varieties and more significant opportunities outside the MIS area.

• Swords into plowshares. Even the hardened cynic will have to admit that many of the CIOs new to MIS have met with remarkable success — more, in some cases, than could be expected from an outsider. Even where success is not overwhelming, the new to MIS usually add value, whether by creatively introducing new ideas or questioning our entrenched dogmas.

The ambitious MIS professional will seize the opportunity to learn from this radically (often refreshingly) different leadership.

When the new approaches result in department success, emulation of the former user becomes a highly advisable strategy. Because outsiders are often handicapped by management based on their track record elsewhere, it makes even more sense to copy many of their role model traits.

• So motives are selfish after all. If an outsider can effectively turn the MIS message more effective than veterans have been doing, then it would be stupid for us not to welcome his efforts. The simple fact that a previously unbiased user manager supports an MIS position can promote ob-

jectivity and, hence, the wisdom of certain proposals. Therefore, when faced with persuasive but unindoctrinated users, our mission should be to instill in them our belief in the benefits and responsibilities of information technologies. If our ideas are then spread to more elevated levels, the likelihood increases that they will be adopted on a corporate basis.

Nor should we overlook the tendency of influential leaders to serve as sources of information for the MIS department. With strengthened ties to user departments, knowledge of corporate strategies, new programs, even executive whine, MIS increases its value to the company. One of the strengths often found in non-MIS CIOs and hard to come by for career MIS professionals is entry to top management circles. We should take maximum advantage of this benefit.

All in all, increasing cases of users entering MIS, even at the highest levels, is not a bad thing. After all, our profession has worked very hard to build bridges with the user community and to make our disciplines more accessible. What better way to prove our success and continue to remove barriers than to encourage people to move between departments?

As this trend continues, the us vs. them mentality may become a thing of the past.

These MIS neophytes will be especially valuable when we go beyond just tolerating them and accept them into the profession. Their newness is no reason they cannot join us in promoting our professional beliefs and standards. We must help them become MIS professionals, not remain outsiders making a whistle-stop at MIS.

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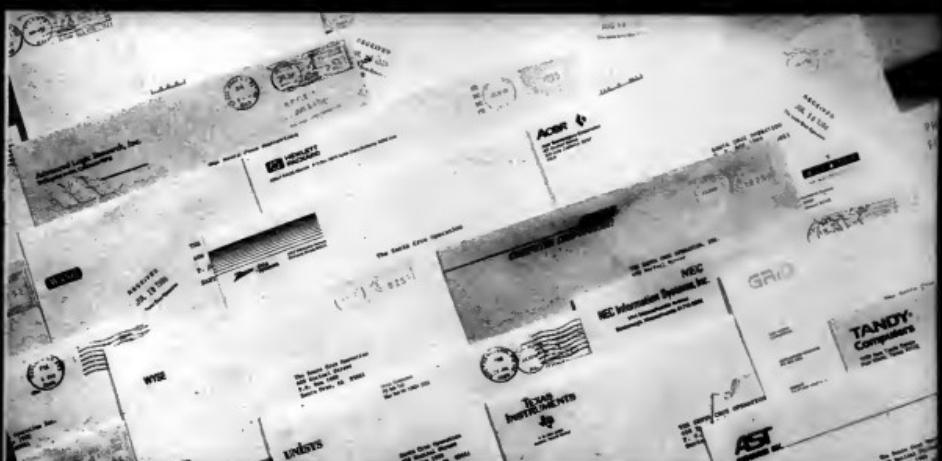
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news & analysis

UPDATE

UB stakes networking claim

Ungermann-Bass is fighting back. Tired of seeing others taking the credit (and until now the money) for enterprise-wide networking, president and founder Ralph Ungermann hit the trade press trail recently to both reemphasize the company's arms-length policy with owner Tandem Computer and to reclaim what Ungermann says is rightfully his company's in enterprise-wide networking.

The big UB weapon is AccessOne, a network management system that works as a nerve center for channeling data across a slew of different hardware platforms. Ungermann-Bass has tried to cover most of the bases with AccessOne, tying it into the fast-moving Transmission Control Protocol/Internet Protocol, IBM's NetView network management system and Apple Computer's Macintosh workstations.

Ungermann claims his company was the first in enterprise-wide networking. In 1985, the company ran full speed into a declining economy and a corporate America suddenly in no mood to build large networks, an area that was UB's bread and butter.

Now, Ungermann says, the market is ready, and communications standards, integrated software and a user mind-set given to integration in general are the keys.

You can go with Digital Equipment or IBM and you can be safe, Ungermann pitches, or you can go with UB and be truly open.

Ungermann also managed to drop a nice oxymoron, classifying UB's relationship with Tandem as "cooperative independence." Who says there are no political speech writers in this industry?

IBM adds to network stable with standards-based war

Ungermann's recent press trip might have been designed to take some of the thunder from IBM's network product rollout in September. Part of the IBM product list, in fact, looked like a gesture toward universal networking brotherhood: The OS/Communications Subsys-

tem, OSI/File Services, TCP/IP for MVS and Netview support for the Open Systems Interconnect model were a significant nod toward communications standards outside IBM's mainframe Systems Network Architecture networking environment. IBM is now a standards animal.

In its drive to control the crucial network management systems market, IBM also introduced enhancements to its NetView/PC management system, such as support for IBM's OS/2 Extended Edition. The debut was also said to be an attempt to strengthen NetView/PC against criticism that the product reportedly does not do enough at the PC level.

Apollo stays busy launching consortia, products

From the follow-the-bouncing-ball department:

Apollo Computer, the Chelmsford, Mass., engineering workstation vendor that seems to launch almost as many consortia as products, is at it again. The company's newly formed Portable Software Products Group has been created, in Apollo's words, "to promote distribution of processing products and development tools" to users of systems from all computer suppliers.

Coincidentally, to help them do that, Apollo offers its Network Computing System, a set of software tools that helps customers "distribute software programs across many different computers."

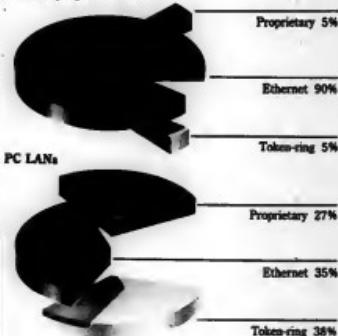
Apollo has been thumbing its chest about IBM's incorporating its own technology into Big Blue's AIX Unix-based operating system. Now both Apollo and IBM belong to the Open Software Foundation (OSF), a consortium dedicated to developing an alternative Unix development environment to AT&T's Unix System V. It turns out that the OSF will develop a Unix environment using IBM's AIX as the core technology. It just happens that many of the OSF members also belong to Apollo's Network Computing Forum, a 100-member consortium chartered with a mandate to "foster

Continued on page 11

LAN of opportunity

Token-ring vs. Ethernet installed networks

General-purpose LANs*



* General-purpose LANs are those that connect large systems (mainframes or engineering workstations).

INFORMATION GATHERED BY COMPUTER INTELLIGENCE. THESE 1986 FIGURES ARE BASED ON STUDIES OF 5,000 NORTH AMERICAN USER SITES.

GRAPH BY BRUCE SANDERS

Toshiba ban sets laptop scramble in motion

The recent decree barring Toshiba America, Inc. from selling its products to the U.S. government for three years has Toshiba laptop computer competitors scrambling over each other to get the action.

Grid Systems Corp., fresh from a takeover by Tandy Corp., has been trying to overcome the stigma of being a vendor of high-priced, specialized laptops. It is also courting third-party vendors to bundle vertical software aimed at increasing its government client base.

But the company plans "to be more aggressive in all markets now, not just the government," says Jeffrey Newman, branch manager in Grid's Framingham, Mass., office.

Tom Martin, who is assistant vice-president of the Computer Business Unit at NEC Home Electronics USA, Inc., in Wood Dale, Ill., says that NEC has been trying to increase its U.S. government business for more than a year, well before the ramifications of the Toshiba trouble were clear.

"There's no doubt, however, that Toshiba's problem has created an opportunity," Martin says, indicating that NEC will be targeting Uncle Sam directly with its three recently introduced NEC laptops, which include a model weighing only four pounds and one built around the Intel Corp.

Continued on page 12

Candy maker Heath takes AT&T to court over contract dispute. See page 10.

Sweet revenge: Heath sues AT&T

Candy maker L. S. Heath & Sons, Inc. in Robinson, Ill., is seeking a \$6 million judgment from AT&T, claiming the telecommunications company did not provide proper equipment and support as stated in a contract signed August 1984.

Among charges filed in Du Page (Ill.) County Court in June, Heath alleges AT&T did not deliver equipment powerful enough to accommodate its users or to process electronic mail, spreadsheet and word processing packages—*in addition to standard data processing applications.*

Also, "software and guidance in developing software was not provided," says James Hartrich, Heath's MIS manager.

As a result of the 1984 contract, Heath purchased an AT&T 382 minicomputer, a 3B5 that was later upgraded to a 3B15, a System 7 PUX, several PC 3300s and related peripherals.

Heath claims it had to replace the AT&T equipment.

For its part, AT&T says it has tried to work with Heath to correct the differences, "but we have not gotten any details," a spokesman says.

"We regret that it's taken this avenue," she says about the lawsuit. As of early October, AT&T had not decided to file a countersuit. —HELEN PARK

IBM offers RPG on PS/2 amid clone cartel fanfare

It was almost lost in the glare of glitzier headlines.

When IBM announced in mid-September that it was bringing its RPG-II report-generation language down to the Personal System/2, it was in the middle of media wars with the clone cartel over the future direction of the IBM Micro Channel.

But for Big Blue's 91,000 System/36 users, the news was too important to miss.

The big thing about the product is that it is a first step toward the fulfillment of IBM's promise to make RPG an SAA language, "says Charles Massoglia, president of System/34, 36 and 38 consulting firm that bears his name. Even though it probably won't be fully System Architecture Architecture compatible, "this is a clear demonstration of IBM's intent" to put RPG-II on a wide range of machines from the microcomputer to the mainframe, he adds from his office in East Lansing, Mich.

Nearly a full 34

The products, dubbed the IBM PS/2 RPG-II Application Platform and Application Toolkit, put an only slightly stripped-

down System/36 on the desk. What is needed, besides the desk, is a PS/2 Model 50 or above running OS/2, with an extra 1MB of memory for the RPG-II module, the company says.

The tool kit, priced at \$1,500, contains an RPG-II compiler and utilities for creating and manipulating formatted screens.

The Application Platform, at \$3,000, provides the bulk of a System/36 environment. It also provides utilities for moving data files between the microcomputer and minicomputer systems.

For users who can't afford or don't need the size of a System/36, IBM's move is, in many ways, a boons. "It makes available the same mass of RPG software on a cheaper platform," says Carson Soule, president of Computer Applications Specialists, Inc., an IBM software house in Beltsville, Md.

If conventional wisdom is right, that amounts to at least 4,000 commercially

available RPG-II packages.

The ability to port RPG-II on the desktop is not new, however. A program called Baby/36, written by California Software Products, Inc., has done that for users since 1985.

What's the baby's name?

Moreover, IBM's recent offerings are, in fact, Baby/36 under a different name, according to Mark Toennissen, public relations officer for the La Jolla, Calif., firm.

Despite their common origin, the IBM and California Software Products versions do differ. Toennissen points out, Baby/36, which can run under either OS/2 or Microsoft Corp. MS-DOS, has a multiauser version available only in a local-area network environment. That means that the nodes in the LAN don't all have to be running the same RPG-II application.

IBM's Platform, on the other hand, which runs only under OS/2, is said to make the PS/2 into a multiauser machine. That ability is valuable, Soule claims, because "there's not much good multiauser software out there."

For applications needing only RPG-II software programs, the product can also offer a way to build a network that is cheaper than a LAN, according to Toennissen. —MARK BRENNAN

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Existing 3270 device solutions: RabbitCLUSTER gives your PCs the capa-

Update

Continued from page 9

network computing applications."

Could Apollo wind up as the little tall doggling a very big computer dog?

Mark Hatch, manager of the Portable Software Products Group, says three ways to look for two major Apollo announcements from his group in the near future.

AT&T remains cool on OSF, teats System V solidarity

AT&T, for its part, remains ambivalent toward the Open Software Foundation (OSF), which recently held a press briefing touting the success of its North American and European membership drive. To make sure no one was blinded by the OSF light, AT&T assembled 18 vendors to mark System V solidarity. In addition, AT&T is reportedly still talking reconciliation with OSF.

Oracle enters financial applications fray

Oracle taking on the big boys in the financial applications mar-

ket? After first blush, it might make sense.

First, there's the window of opportunity created by the economic woes of McCormick & Dodge and Management Science America, two of the big players, in the IBM financial applications market. It's a window Oracle aims to climb through.

Enter Jeffrey Walker, former president of Walker Interactive Systems, a San Francisco-based company that develops IBM mainframe financial applications software. When Walker Interactive took its lumps in the market downturn of 1985, the venture capitalist powers-that-be at the company ousted Walker, who eventually landed at Oracle as that company's chief financial officer. Matching Walker and market opportunity has resulted in Oracle Financials, a set of applications running with Oracle's relational data base systems and software tools, that is very much PC oriented.

Walker agrees that it's a big step for Oracle to go from software tool to software application development, especially when its software is aimed at the non-IBM DB2 world of relational data bases.

But the market has changed direction, Walker says. Where

it's headed is toward decentralized, multivendor, heterogeneous environments and directly away from IBM's centralized, proprietary party line.

"There has always been a need for companies to distribute their accounting functions to departments," Walker claims. "Until now, they just haven't had the technology to do it."

Time will tell, in the true spirit of want, not want set. Walker says Oracle first built its Financials software for its own use. To help them program, the company also used some homegrown computerized software engineering (CASE) tools — the same CASE tools, in fact, that it recently introduced to the market.

Experts hope recent verdict will deter computer crime

The recent conviction of Donald Gene Burleson, arrested for destroying payroll records at his former Fort Worth, Texas, job, has some people delighted.

"I think it's great; it's the first time that someone has actually been convicted for such a crime," says Michael Odawa, president of the Palo Alto, Calif.-based Software Develop-

ment Council (SDC), a consortium of PC vendors. "We hope it will act as a deterrent."

What Odawa is unhappy about, however, is his contention that most of the national press has failed to make clear that Burleson was convicted for placing a logic bomb in a computer, not a computer virus.

"A logic bomb is a one-time event," Odawa explains, "while a virus keeps replicating itself and spreading. A virus is more insidious."

To help battle computer viruses, Odawa and the rest of the SDC have been networking with software developers across the country. The SDC educates developers about viral problems then works with the developers to build and program software vaccines into their software products before they leave the factory.

"It's easier than you might think to program antiviral software into [PC] programs," Odawa says. "The real task is in developing several options for developers to choose from."

And several options are necessary, Odawa says, because one or two options will be easily broken by felons over time. Cooperation in antiviral work among developers is the key but

is sometimes difficult due to the competitive nature of the business.

He also insists that such built-in antiviral programs will add little to PC software prices, arguing that with the spread of computer viruses continuing, the extra cost is worth it.

Fly 'n fax: Firm to place fax workstations in airports

Staying with things that are spreading, let's get to some fax.

Facit Corp., of Cherry Hill, N.J., and Northwest Airlines are placing Faximile workstations in 12 large U.S. airports initially, to be followed by installations in London and Tokyo airports.

Any holder of a Visa, Mastercard or American Express credit card can use the workstations to send and receive information from any other facsimile machine in the world.

Claiming that there are 50,000 business people traveling in the U.S. on any given weekday, Facit says the market potential is a big one indeed. The company's biggest competitor? Hotels, which Facit claims currently account for one-quarter of all public facsimile sites in the U.S. — STAN KOLODGE

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Circle Reader Service Number 8

Laptop scramble

Continued from page 9

80386 microprocessor.

The Toshiba is seen as a boost to Zenith Data Systems, probably the most successful laptop player in the government sector, yet the biggest beneficiaries may be the small vendors trying to get a piece of U.S. government procurement contracts.

"We want to get at least 5,000 [laptop] units from this [Toshiba] situation," declares Louis Belmont, vice-president of international sales at Ogivar Technologies, Inc., a Montreal-based laptop maker.

Confident of Ogivar laptop technology, Belmont says Ogivar's plans for 1988 are to capture 10%, or 15,000 units, of Toshiba's U.S. laptop market share of 150,000 units.

"The government share is going to give us a third of our goal," Belmont claims, "and that makes the rest easier."

The next important step, he says, is in getting the U.S. government's attention before other, more established competitors close in. "We've put specs into the government to let them know we're here," Belmont says. "And we're marketing aggressively."

There is also no lack of aggressive financing in this industry.

What's going to win Ogivar big govern-

ment contracts, Belmont explains, is Ogivar's gas plasma display technology, the orange-tinted screen lighting that is said to be readable in direct sunlight conditions. Because Grid is the only big competitor offering gas plasma displays, Belmontrates that Grid is Ogivar's logical competitor. At least, it is if it weren't for what he says is Grid's steep laptop prices. Grid's Newman counters by emphasizing that Grid also has low-price machines.

Belmont's job at the more traditional (and more criticized) LCD screens found on most laptops is carried by Martin with NEC, whose systems use the technology.

"There has been much progress made in LCD technology," Martin claims, "and

that's evident in the new line of machines NEC has introduced. Besides, our studies indicate most users hate the orange plasma displays, and anyway, gas plasma costs too much power for battery-operated laptops."

One thing all of them agree on, however, is the surge in laptop sales, which NEC places at 30% to 40% in the U.S. in 1988.

Improvements in display technology might be one factor in the increase in laptop sales, but Martin also says he believes it is a case of more for less.

"You can get 386-based portables running at 16 MHz and, in some cases, up to 100-MHz disk drives in a machine weighing less than 20 pounds and fitting in a briefcase," Martin explains. "People have been waiting a long time for a portable version of their desktop computers, and they're finally here." (One laptop vendor, U.S. Micro Engineering Corp. in Boulder, Colo., even boasts a laptop model sporting a 300-MHz hard drive.)

The growth in the laptop market has led Compaq Computer Corp., IBM and Apple Computer, Inc. to schedule laptop introductions for late 1988/early 1989.

Compaq, after some previous failures to develop laptops under what it terms its "roadmap" standards, says it is finally ready. On Oct. 17, the company introduced its T17/286, a 12-MHz Intel 80286-based laptop featuring either a 20MB-type or 40MB-type hard disk, 3½-in. 1.44-Mbyte floppies and LCD screen.

IBM is aiming to redress the failure of its 1986 PC Convertible laptop, and observers predict Apple's Macintosh laptop will make an appearance sometime by the end of the first-quarter 1989. The Mac machine will be initially aimed at the large installed base of Mac business users.

Doesn't intend to flounder

As for Toshiba, it has other fish to fry. The company maintains that the loss in U.S. government business will not break its stride, and it could be right.

Computer Intelligence, a La Jolla, Calif., research group, says that Toshiba surged ahead with about 27% of the Fortune 1,000 laptop market in 1987, followed by Hewlett-Packard Co. with a 22% market share. Computer Intelligence sees no reason to change those figures for 1988.

In any event, Toshiba isn't looking back. This summer, the company introduced the T15/16, a 586-based laptop that runs at 16 MHz, carries 2MB bytes of onboard memory and has powered some good reviews. In early October, the company introduced another 386-based machine.

Protecting its low-end machines, Toshiba also recently cut the prices of its T1200F and T1200FP laptop machines to counter increasing competition at that market level.

Finally, to bolster distribution channels, Toshiba has also just entered into an agreement with Sears Business Centers whereby these Sears, Roebuck and Co. computer retail stores will carry Toshiba's full line of laptops across the U.S.

As for the increased laptop competition, Dean South, senior product manager of personal computers at Toshiba America, shrugs and indicates that this competition was expected.

"It's going to be a lot harder on those companies just getting into the [laptop] market," South says. "We've already proven ourselves." — STAN KOLONOFF

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Circle Reader Service Number 9

Busing issue polarizes AT users

Take your pick: EISA, MCA, Nubus, VMEbus, Multibus...

For all you IBM Personal Computer AT-compatible users out there who are anxious about getting a faster I/O bus, the compatible makers that brought you your non-IBM computers in the first place have three words: Not to worry.

Led by Compaq Computer Corp. in Houston, the nine main companies that make up the so-called "circle cartel" are readying a design for a 32-bit bus called the Extended Industry Standard Architecture (EISA). Its features include a 24-bit address space, an 8-MHz clock (that can be pushed to 30 MHz) and compatibility with the earlier 16-bit AT bus. With EISA, designers can reportedly integrate sophisticated I/O controllers into the system and provide a high-speed burst mode for I/O data transfers.

"It's a necessary move . . . to present a strong [market] position," observes Bruce Stephen, a personal computer analyst for International Data Corp. (IDC), a market research concern in Framingham, Mass. "It's a move for their buyers."

Those buyers are expected to represent a U.S.-installed base of 5.7 million Intel Corp. 80286-compatible computers by year's end, according to IDC figures. Last year, the total number installed was 2.81 million, all of which prompted Stephen to classify the AT and its compatibles as "the mainstream computer. It's what the PC was in 1984." 1984 will be regarded as "the future and frontiers."

In contrast to the installed base of AT compatibles, IBM is expected to have only 2.51 million PC ATs installed by the end of this year; it had an installed base of only 1.46 million units at the end of 1987. In an attempt at wholesale user migration to its Personal System/2 line and 32-bit bus, called the Micro Channel Architecture (MCA), IBM appeared to abandon its AT bus commitment. However, in Sep-

tember, IBM brought out the PS/2 Model 30 286 that supports the 16-bit de facto standard bus for AT machines.

Looking to slow the compatibles' market momentum, IBM apped the cross-licensing fees for the MCA in its PS/2 family. The intent became the rallying point needed to get clone manufacturers to solidify what had, in the past, been little more than talk about an AT-compatible 32-bit bus design.

In no rush

But for all the users who are baulching at the bit for EISA's high-bandwidth throughput, there are others who are calmly taking a wait-and-see attitude.

"I don't care one way or another about a bus architecture. All I care about is what the machine does," says Jim Ross, systems officer in the professional computing service division of Continental Illinois National Bank in Chicago. Among the bank's installed base of 1,700 personal computers are 150 AT compatibles made by Tandon Corp. and 400 Deskpro 286s by Compaq. Ross says he's still evaluating the September EISA announcement.

Going with "the MCA is a hard decision to make because we don't know what kind of effect on connectivity it's going to have down the line," he says. In the midst of users and vendors scanning the EISA vs. MCA bus routes, Digital Equipment Corp. has come out with equipment that will connect PCs using MCA into a Decnet network. DEC has also signed a technology exchange agreement with MCA-compatible vendor Tandy Corp., that allows DEC to read Tandy products.

Meanwhile, yet another bus option is the 32-bit "open" Nubus, now owned and licensed by Texas Instruments, Inc. by way of MIT and Western Digital Corp.

In 1987, Apple Computer, Inc. intro-



duced the Macintosh II workstation, the first non-TI system based on the Nubus. In the tail wind of the Macintosh II's success has come a great deal of Nubus support from third-party suppliers of add-in communications, memory and processor boards. There are also several Nubus developer boards aimed at creating systems around the Mac II.

Many Nubus board makers also sup-

port numerous other microcomputer bus es such as IBM's AT bus, Motorola Inc.'s VMEbus and Intel Corp.'s Multibus. The

point is, Nubus supporters are not out of touch with the computer mainstream.

Everywhere they look, industry observers see good things ahead for Nubus and the Macintosh II. IDC estimates that when the dust settles, Apple will have sold 310,000 Macintosh II workstations worldwide this year.

That's a good basis for support and a strong argument that the race for desktop workstations will be riding on more than just MCA and EISA. — HELEN PRICE AND STAN KOLOSKY

What's Next from Apple expatriate Jobs?

Coming to a university or software developer near you: The Next Computer System.

It's real — although many of its features can be found separately in other personal computing machines, such as the Commodore Business Machines Inc. Amiga, the IBM Personal Computer, Inc. Macintosh, and the Apple Computer, Inc. Macintosh. It's available, although only to universities and software developers. It's expected to use the Transmission Control Protocol/Internet Protocol — although at a 32-bit Ethernet network communications port that supports Sun Microsystems, Inc. Network File System file transfers and a Texas Instruments Inc. Nubus backplane.

In a black, magnesium box,

the industry's newest entrant represents a three-year, multi-million-dollar effort by Steven P. Jobs, the cofounder of Apple and the co-designer of the Macintosh, and DP czar H. Ross Perot.

The company is Next, Inc. in Palo Alto, Calif. The operating system is a University of Carnegie-Mellon Unix 4.3 version called Mach developed at Carnegie-Mellon University in Pittsburgh. The computer's heartbeats is a Motorola, Inc. 68030 microprocessor with a 25-MHz clock with room for custom chips in processors that Jobs developed with Pixar, Inc., a San Rafael, Calif., graphics imaging firm that originated at the New York Institute of Technology. There also is a 10 million instructions per second Motorola 56001 digi-

tal signal processor that not only digitizes audio but also synthesizes sound and speech.

The multitasking workstation's 32-bit address space is structured to go up to 64 bits. It also comes with an erasable optical disk drive and printer from Canon U.S.A., Inc. Its 8M bytes of memory are expandable to 16M bytes.

The machine's proprietary semiconductor outlet, specifically in the area of its 12 channels of direct memory access I/O buffers, prompted Jobs to dub the design "mainframe-on-a-chip."

"Higher education . . . wants a personal mainframe," Jobs said at a recent conference.

Jobs also brokered development of the unit's image-generation and file-description language with Adobe Systems, Inc., a desktop publishing software company in Palo Alto, and augmented its icon-driven Unix user interface with technology licensed from IXI Ltd., a year-old start-up in Cambridge, England.

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MIS purchasing

plans for '89

Buying time

BY HELEN PIKE

Y

ou are at the threshold of 1989. You have been given a budget for next year. You have talked to your users. You have looked at the equipment in your division. You have figured out what's to be connected and what your software needs are. Now you are ready to see if your dreams can come true.

Some of you will read the specialty publications and listen to vendors that come knocking on your door. Or maybe you'll make a site visit to a promising manufacturer. Others will go to niche shows on, say, networking, to get the latest technical skinny.

Then there are those who will go to that Twilight Zone known as Las Vegas, where, beyond the pulsating neon, you may find what you came for . . .



BOB COOPER



Comdex is that tidy coincidence between companies' annual budgets and vendors' product development cycles. It is the industry's yearly autumnal buying ritual. More than in years past, the fall of 1988 will have a greater emphasis on systems integrators and the increasingly influential role that value-added resellers and marketers will have in breaking technology between end users and OEMs (see story right).

Among those who are planning to attend or to send staff to Comdex/Fall '88 is Jim Ross, systems officer in the professional computing service division of Continental Illinois National Bank in Chicago. Ross reviews and recommends hardware and software for about 9,000 employees who use more than 1,700 personal computer-class machines, including portables.

Of the bank's technical direction in 1988, a lot of attention will be given to networking, according to Ross, and to tools for writing applications software.

"We are positioning ourselves for token ring somewhere down the line as a strategic angle. It's better than Ethernet," Ross says. The bank already has nine local-area networks in a departmental processing environment, half of which do database applications. "Right now, there's a small surge of demand for networks, but we're not ready for enterprise-wide local-area networking."

As an interim step, Ross says, Ethernet may be used. "It's like the philosophy of token ring. It seems more robust."

Continental Illinois already has a wide-area network linking mostly IBM 3270 devices in five buildings in the downtown Chicago area. The bank hopes to leverage the setup with micro users down the line.

"I expect to see more business applications, instead of productivity applications, moving onto the micros," Ross predicts. "It's an economic consideration more than anything else. Our clients are really driving it."

As part of that goal, the bank is doing a study on software productivity tools. Ross says he expects to see more applications developed to run on PCs and share data with the host.

Continental Illinois is a Computer Corp. shop, Ross says, the result of an implementation that began about 2½ years ago when the bank ran into a shortage of IBM Personal Computer ATs. It looked to the Houston computer firm as an alternative supplier that happened to have a faster machine. The bank's installed base is made up of 400 Compaq Deskspro 286s, more than 300 Deskspro 386s and 250 Compaq portables, 450 IBM PCX 110s, 60 ATs and 100 PCs and 150 Tandon Corp. AT compatibles. The bank's need

Comdex mirrors industry trends

EACH YEAR, COMDEX gets more torque.

Comdex/Fall '88 has 200 more exhibiting companies than the 1,500 it had last year. It has 400 overseas companies this year vs. 200 last year. It has expanded to 900,000 square feet of exhibition space from the 750,000 square feet 12 months ago. It has a preregistration run rate that, as of September, was twice as much as it was in 1987; 95,000 showgoers signed up for the fall conference last year.

While its Las Vegas setting may make it seem larger than life, Comdex can easily be brought to scale. According to Richard L. Schwab, show director, Comdex is a department store instead of a boutique.

"It's an embodiment of the industry," he says from the Needham, Mass., office of the Interface Group, Inc., the show's sponsor. "What happens is what the industry wants."

And what does the information industry want this year? Enhanced PCs, OS/2 software, more Intel 80386 boxes at more varied prices and more packages with graphics in them, Schwab says. It also wants, and is going to get, more communications prod-

ucts, which are growing in influence, he adds. And next year, Comdex/Spring in Chicago will feature Macintosh for Apple Computer, Inc. Mac resellers.

In all likelihood, users will more often get their products through distributors, he claims. "Increasing quantities of smaller units are going through the distribution channel.... Forty-five percent of the Fortune 1,000 market is getting communications products through value-added resellers vs. 55% getting them from basic suppliers," he says.

The trend reflects what Schwab says is a larger movement taking place in the information processing community. It is, he reports, a trend from host processing to communications processing; a trend in which computers and communications capabilities will blur; a trend in which the business decision of what has to be done will blend with the technical decisions on how it is done.

"It's going from how to do payroll to getting cost-related information of which payroll is a component," he explains. "It's a natural evolution." —HELEN PARK

for personal computers seems almost inevitable.

Although the bank doesn't buy in bulk, it does average about 30 PC purchases a month. Says Ross, "The saturation point doesn't seem to happen. It

hasn't slowed down yet."

Preliminary MIS forecasting for 1989 by Marty Gruber, vice-president of The Sierra Group, a market research concern based in Tempe, Ariz., indicates that the desire for PCs at Continental

Illinois is not an isolated event.

Next year will be a banner year for industry-standard PCs, especially at the low end, Gruber reports, saying that "1989 looks like a year in which users will assimilate and upgrade what they

have, strengthening software and networking functions."

But amid the razzle and the dash that is Comdex and Las Vegas, Gruber also warns of a slowdown in the industry that never sleeps. Gruber, who regularly surveys top MIS executives in the U.S., says, "There's no budget push on technology."

"Don't count on them buying one of everything," she says, referring to the voracious purchasing that went on in the header, more experimental days of the personal computer industry.

"There's a feeling in the air," Gruber says. MIS professionals are realizing that "if I want to see a product, I'll go to the vendor or make him come in," she says about making product evaluations on site rather than on a trade show floor.

It's getting harder at large industry shows like Comdex to get a sense of a vendor's strategic direction, she continues. Where there used to be 10 or 15 major vendors, now the exhibitors are splintered among smaller concerns, many of whom start-ups competing alongside the more established companies.

For those making PC buying and implementing plans independent of Comdex and any unwillingness there, Gruber sees a new phase in disseminating data on products and technology. The forums, she says, will be niche shows that will add value to what users already know.

Also, some MIS executives may be constrained by budgets and geography or may pick their purchases from specialty shows because they have already

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PURCHASING PLANS

standardized on a certain platform, she adds.

One such executive who works for a Fortune 500 company and wishes to remain anonymous evaluates products for 40 MIS managers to buy. While he regards Comdex "as a good industry overview, that's not where we're at." Instead, he is going to Macworld Expo, PC Expo and communications show, because in that way, "you've covered it all."

So not everyone goes to Neva's Noon Dream Zone. Michael Danatos, lead systems analyst/programmer for a privately held natural resources equipment company in New Jersey, instead goes to the Information Management Exposition and Conference, the Novel Network Show and the IBM Share user group gathering, which "is geared to having meetings with me in them."

Danatos' budget for 1989 is designed to handle "more volume and more organization" for the equipment company. Until recently, Danatos' computer buying tended to be reactive, responding to users' immediate needs. Now, with 1989 less than two months away, he is targeting his purchasing at four main areas: a networked business package, desktop publishing, an artificial intelligence-based repair maintenance system for the company's sales representatives and upgrades for terminals that tie into an IBM 3090 mainframe.

Much of the New Jersey company's new PC volume will be tied to networks in three Texas sales offices. To build a

networked business system that will tie together accounting, purchasing and the loading dock, Danatos also plans to add about 50 micros at those sites. To tie all the PCs together, he is leaning towards purchasing a Novell, Inc. LAN, although the company is also debating the finer points of token ring and Ethernet.

Desktop publishing is taking another chunk of the computing budget. The company has gotten into publishing slowly, "but now it's exploding," Danatos says. He plans to buy 12 Compaq Desksys 386-class machines to handle the company's desktop publishing efforts.

He also plans to buy Compaq portables for the field reps as part of the design of a repair maintenance system. This project, for an equipment division,

from New Jersey, southwest to Houston and northwest to Calgary, Canada. According to Danatos, about 15% to 20% of the terminals on the system are already micros.

"We'll be buying more — mainly new devices as we add new employees, but some for replacement — purely to act as dumb terminals. It's cheaper to buy PCs than it is to buy IBM terminals," he says. The choice of personal computers is clear.

"We are really happy with our Compaq and Dell," Danatos says concerning the performance of the organization's Desksys 286s and Dell Computer Corp. Systems 200s and 300s.

Like Danatos, Paul Kostel, end-user group project manager of GATX Corp., a financial holding company in Chicago, shuns

"standardization" for 1989.

"We're trying to do a little more with what we have," Kostel says, referring to GATX's nearly 140 micros. "Before, we were at the stage where users would call on us to say, 'We need another printer.' Now, we're putting in a lot of application systems. Users call us to look at their group and tell them what we can do to automate their operations more."

Besides, GATX has

"pretty much reached the saturation point in terms of numbers — there is almost one terminal for each person — and there is not a lot of need right now," he says. PC purchases will be limited to replacements.

High on the priority list at GATX for 1989 may very well be networks. Kostel says the plan is to add to the firm's single-LAN capability by building three networks able to handle seven to 10 people and machines.

As part of the core analysis, Kostel is identifying groups that need to share databases or costly peripherals, such as a graphics system that requires an expensive film recorder and color printer. Kostel says it is the organization's hope that networks will ease day-to-day administrative tasks throughout the company, such as multiple access to the purchase-order system and document editing.

GATX's 1989 strategy is

"1989 looks like a year in which users will assimilate and upgrade what they have, strengthening software and networking functions."

MAFFY GREEN
SERRA GROUP

will let the reps perform co-site analysis at their customers' wells. By taking a Compaq 386 portable into the field, the reps can shorten the time it takes to determine what, if any, changes in the mix of equipment are needed to get the wells to produce more.

Danatos also intends to add personal computers to the 3090 mainframe system whose 1,000 users are stretched in an arc

the larger trade shows in favor of smaller ones, especially if they are put on by a company whose products he uses a lot. Explains Kostel about the attraction of more focused shows, "Vendors send their best people who can answer your questions."

Getting good answers is important to GATX because an attitude of buy, buy, buy has been replaced by watchwords such as "stability," "consolidation" and

"standardization" for 1989.

"We're trying to do a little more with what we have," Kostel says, referring to GATX's nearly 140 micros. "Before, we were at the stage where users would call on us to say, 'We need another printer.' Now, we're putting in a lot of application systems. Users call us to look at their group and tell them what we can do to automate their operations more."

"It takes awhile to learn technology in this office . . . so we want something that will last and be supported for a long time," Kostel says. He is keeping a cautious eye on the crop of Intel Corp. 80386-class machines as well as on IBM's Micro Channel Architecture.

The more the standardization around a machine, the better his staff of five can support GATX's users, Kostel adds.

For getting technical insights that will help with purchasing plans, Sam Whidden, computer services director for the American Mathematical Society in Providence, R.I., attends DECUS, the Digital Equipment Corp. user group.

Taking into account the math society's IBM PCs, its clutch of clones and some Apple Computer, Inc. Macintoshes, Whidden has wonnowed the nonprofit organization's hardware platform down to DEC's VAX architecture and has made the personal computers nodes on an Ethernet network.

"We try not to buy a hodge-podge of products . . . and we try not to buy big equipment," Whidden says.

"We prefer to buy computing power in smaller increments," Whidden says.

The agency, which does research methodology, is moving the route of distributed computing, because it costs less to buy in smaller chunks, Whidden explains.

In addition, "the time seems to have come to distribute our computing around . . . to put task-oriented computing in the hands of individuals," he says.

The agency has 200 users in a Vancouver that is based on a VAX 8600/8700 configuration. Whidden says he intends to upgrade the 8700 to an 8820 for an approximate cost of \$350,000.

The society does heavy applications development for in-house data processing, business applications, subscription fulfillment, financial applications, inventory and member records of which there are about 20,000.

The end result is to have users "download their own workstation to their hearts content," Whidden says.

Plus Computerworld's senior writer, Computerworld Features editor Mark Breitbard contributed to this report.

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Micro melting pot

PC-to-Mac connectivity in maturing LAN market

BY NINA BURNS

The personal computer local-area network industry is maturing rapidly as a critical mass of PCs provides the impetus for the spread of PC LANs in all businesses. Originally, users purchased PC LANs to share expensive peripherals such as high-speed printers and hard disks. Today, users are looking to integrate all of their diverse desktop devices through PC LANs to share information between personal computers, mainframes and minicomputers.

Businesses are beginning to standardize on LAN products and to incorporate PC LANs into their

enterprise networking strategies. In addition to the PC invasion, several market forces are driving this LAN surge, including the following:

- The rapid increase in the penetration of Apple Computer, Inc. Macintoshes into traditional IBM Personal Computer environments, stimulating the need to share information between dissimilar desktop computers through the network.
- Technology advances in personal computer hardware and software, such as faster processors, and more powerful operating systems like IBM OS/2. These advances provide the platforms upon which a whole new generation of network applications will be built.
- Strides in personal computer connectivity allowing the connection of both IBM PC and Macintosh workstations to the network.

Numbers from Infometrics, Inc., a Santa Clara, Calif.-based market research firm, underscore the standardization on PC LANs. In 1987, 11%, or 323,000, of the 2.9 million desktop computers connected to the approximately 424,000 personal

computer LANs were Macintosh workstations. Eighty-nine percent, or 2.6 million, were IBM PCs and compatibles. By 1991, Macintosh workstations will represent 24%, or 7.2 million, of the 2.9 million personal computer LANs. IBM PCs, Personal Systems/2 and compatibles will make up 76%, or about 23 million, of that figure.

In the past, these personal

computer LANs consisted of either all Macintosh workstations or all IBM PC workstations. Today, the rapid penetration of the Macintosh into all segments of the market has driven the need for mixed PC LANs that support IBM PC and Personal Systems/2, IBM compatibles and Macintosh workstations on the same network. File and print sharing between these diverse personal computers is beginning

to be possible. For example, users are now able to send a Lotus Development Corp. 1-2-3 spreadsheet to a Macintosh Excel spreadsheet who can then see the file, make changes and send it back.

Alameda, Calif.-based Tops, a Sun Microsystems company, was the first company to achieve widespread integration of Macintosh and IBM Personal Computers on the same network in 1986. In August 1987, 3Com Corp. in Mountain View, Calif., introduced its 3+ for Macintosh, which allowed Mac connectivity on 3Com 3+ networks. In July 1988, 3Com significantly improved 3+ for Macintosh to run on IBM PC and compatible servers rather than solely on 3Com's proprietary servers, thereby servicing the majority of PC LAN users who prefer IBM PC and compatible servers.

Also in July, Novell, Inc., in Provo, Utah, announced Netware 2.15, which allows Mac connectivity to Netware LANs with full Apple File Protocol (APP) support. APP is Apple's proprietary networking protocol and means that Netware will let users access AppleTalk servers to Macintosh users who will now be able to share files and printers with PC Netware users.

Rapid market expansion is taking place now as the primary participants in PC LANs introduce products and strategies,

Burns is vice-president/senior analyst at Infometrics, Inc., a market research, performance testing and consulting firm in Santa Clara, Calif., that specializes in data networks and image and document processing.



MIS manager buys M



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If you need to run DOS programs such as 1-2-3 and dBase III, there are several easy ways to do that. One is the AST Mac286 card. Which you simply plug into a slot in the Macintosh II for AT-type

performance. Or, if you prefer not even to lift a screwdriver, SoftPC is a software program that lets you run both DOS and Macintosh applications at the same time.

After closer analysis, however, you may find that the kind of compatibility that really important is the ability to share information effortlessly between computers. Particularly if you have years of accumulated data stored away on PCs.

Here the Macintosh concept of workgroup computing proves in practice. In fact, you may find it easier to network Macintosh computers with PCs than to network PCs by themselves.

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translated to their Macintosh counterparts with formatting intact. Crossing the border is equally easy when you transfer data between 1-2-3 and Excel for Macintosh.

If you don't choose to network, there are other simple ways for Macintosh and PCs to communicate. One is DaynaFile, a Macintosh disk drive system that reads data directly off any of the several DOS disk formats. Another is MacLinkPlus, a cable and software system for sharing data between two computers.

But no matter where the information originates, or how its transferred, once on the Macintosh, this computer's unique power to analyze, enhance, and graphically communicate that information is unmatched. Which is one reason Macintosh is moving into formerly DOS-exclusive realms in such great numbers.

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MULTIVENDOR CONNECTIVITY

form strategic alliances and complete mergers and acquisitions that will carry the industry into the 1990s. Mac connectivity is a pivotal issue for these major players, namely, 3Com, Apple, IBM, Novell and Tops, who are expected to remain the primary PC LAN vendors through 1991. New entrants will offer a range of products, but the market will be dominated by these firms.

3Com was one of the earliest entrants into the PC LAN industry. Early market penetration with the Etherseries and 3+Open operating systems and Ethernet board-level products assured the company's market position. Today, 3Com ships about 9% of all PC LAN operating systems. Infonetics says. By 1991, the research firm expects that figure to increase to 12%. Infonetics predicts that 3Com's position in the market will increase over the period from 1989 to 1991 for the following reasons:

- 3Com will take the lead in Microcorp's OS/2 LAN Manager series with 3+Open, its network operating systems based on the OS/2 LAN Manager. In 1989, users will install pilot 3+Open networks.
- Products from Bridge Communications, Inc. and Communications Solutions, Inc., which are recent 3Com acquisitions, will bring additional opportunities to 3Com in terms of interworking and IBM connectivity.
- In 1990, users will purchase more 3+Open networks after successful pilots, and in 1991, more network applications will become available from third-party developers for the OS/2 LAN Manager, which will drive more network sales.

Most of 3Com's sales are into the PC-only LAN environment. Penetration in mixed PC and Macintosh environments has been weak. First of all, 3+for Macintosh has not achieved anticipated market penetration because of the lack of AFP support, which has resulted in incompatibilities. Until the third-quarter 1988, for example, the firm's 3Server3 was required to run 3+for Macintosh. Secondly, 3+Open will not have direct Macintosh connectivity in its initial version, which may hurt potential shipments into mixed environments. Instead, Mac connectivity will only be offered via bridges to 3+. Direct Mac connectivity to 3+Open will help 3Com's sales in mixed environments in late 1989 and 1990, when the company is expected to begin supporting AFP.

Tops has grown substantially in the Macintosh-only and mixed-LAN environments since its first product shipments in late 1986. Infonetics outlines several factors that support the 3% gain it predicts for Tops from 1987 shipments of 8% to 1991 shipments of 11%:

- Tops has been very successful

in the low-end networking market, which it is reported to be simple to install and use. This success should continue with limited competition from Novell's Entry-Level System product and 3Com's 3+Open LAN Manager Entry Version.

As a pioneer in PC-to-Mac integration, the company will continue to lead new sales in this market though Novell is expected to threaten Tops' dominance with its initial Novell mixed-LAN sales coming from its substantial installed base. 3Com will likely also threaten Tops' position in 1990 when sales of 3+Open are expected to accelerate.

Apple shows a 1% increase in its share of 1991 shipments (4%) compared with 1987 shipments (3%). New Apple products will contribute to increased Apple shipments, although Apple is not considered a major vendor in the mixed PC and Macintosh market.

The company's first entry

into PC connectivity, Appletalk PC Card, has not lived up to initial expectations. Furthermore, Infonetics user surveys indicate that users prefer more inexpensive server solutions such as those from IBM PC compatible makers.

Apple's substantial contributions to networking will continue to set the desktop standards in graphical interfaces, however.

Performance driving

The company is also providing platforms for a new generation of software applications based on network group computing. It is expanding seamless Mac integration in diverse computing environments through development relationships, such as the one with Digital Equipment Corp., and through the company's acquisition of Orion Network Systems, Inc., in Berkeley, Calif. Orion develops and markets IBM-compatible Systems Network Architecture (SNA) Network

products that allow non-IBM computers to communicate with IBM machines, and the company's expertise will help Apple expand into the IBM world of 3270, LU6.2 and Token-Ring.

Novell will continue to dominate the PC LAN market. It is strong in all market segments — from small to medium to large businesses — and will continue to provide multiple protocol solutions. Novell is the first PC LAN vendor to provide complete network services to Mac workstations and to support Apple AFP fully. Furthermore, Netware 2.15 will support LocalTalk and EtherTalk, Apple's network protocols, which other competitors do not currently supply.

Novell will continue to enhance its operating system software by providing the services and tools necessary to support all desktop computer platforms, such as Apple's Macintosh Finder, IBM's OS/2, Microsoft's MS-

DOS and others, and to expand the PC LAN into corporate networks — LU6.2, Transmission Control Protocol/Internet Protocol and Open Systems Interconnect. Novell's recent major investment in Los Angeles-based Indigo Software, Inc., a maker of software that provides access between diverse computing environments, indicates the firm's intention of expanding the PC LAN to IBM environments. Netware VMS provides access to DEC VMS systems using the Decnet transport mechanism.

In 1987 and 1988, Novell benefited from confusion in the marketplace about IBM's PS/2 and OS/2 announcements and speculation about 3Com's position on OS/2 LAN Manager, as well as from the arrival of Microsoft OS/2 LAN Manager and IBM OS/2 LAN Server. Novell will experience some competitive pressure from IBM, Tops, 3Com and other OS/2 LAN Manager providers, which will cause the vendor to lose about 2% of its share of network shipments from 1987 (44%) to 1991 (42%).

IBM has not been a strong player in the PC LAN market because of the weakness of the IBM PC LAN Program. However, Infonetics expects the vendor to improve its position with the PC LAN Server even though IBM will lose 3% share of shipments from 1987 (21%) to 1991 (19%) for several reasons:

- Its lack of support of Mac workstations. A greater percentage of the overall mix of network shipments by 1991 will be into mixed-LAN environments in which IBM has no current solutions.
- The lateness of its OS/2 LAN Server.

- The company's lack of connectivity to non-IBM environments.

The PC LAN market will have to grow faster on providing private file services to isolated homogeneous PC LANs. Performance and ease of use have been the issues. The future challenges facing PC LAN vendors include supporting multiple desktop computer platforms (Macintosh, MS-DOS, OS/2 and Unix), integrating PC LANs into the corporate network of minis and mainframes (particularly Decnet and SNA) and providing the platforms for a new generation of PC LAN applications that will allow users to access information anywhere on the network.

Performance and ease of use will remain important, but the picture is getting much more complex, encompassing gateways, bridges, multiple protocol stacks and standards such as OSI and TCP/IP.

The winners in this market will be those vendors that can provide the best communication, distributed processing and performance without compromising ease of use.

The Times they are a-changin'

BY AVERY JENKINS
SPECIAL TO CW FOCUS

THE VENERABLE *New York Times* may have changed the look of its front page for 50 years, but inside the operation, the newspaper's MIS department has been keeping up with the times, and these days, that includes using the Apple Macintosh.

Managed correctly, the combination of Macintosh computers and an IBM environment causes few problems, according to Henry Heller, manager of personal computers at *The New York Times*. Heller has been installing the Macintosh in various departments at the newspaper.

The Times has 660 IBM Personal Computers and 31 Macintoshes. Heller expects that number to grow to 1,000 PCs and 50 Macs in the next two years.

The newspaper's art department is equipped with Macs, and other areas, including the advertising department and the marketing group, are also adopting the Mac.

"We are very strict about what's allowed to be done on the Mac," Heller says, adding that it must be a graphics application to justify a Macintosh purchase. Other common PC applications, such as spreadsheets, are not sufficient to deserve from the company's IBM-compatible majority, he explains.

Not only are the applications limited, but the requirements for connecting the two types of machines are also restricted.

Heller says that at the newspaper, data usually only flows one way — from the PC

Jenkins is a Boston-based free-lance writer.

to the Mac. This occurs in cases in which the PC performs the number crunching and the managed data is sent to the Mac to create high-quality graphics. In such situations, Heller uses Dayna File, a tool from Dayna Communications in Salt Lake City, to transfer data from one system to the other.

About one-half of the Times' Macintoshes are connected to each other via the AppleTalk network from Apple, Heller adds. And, in one special case, he says, a Mac, a PC and the newspaper's Harris Corp. production system are linked. This connection allows Mac graphics to be sent directly to the typesetting system.

The reason the Times turned to the Macintosh is an economical one, he claims. Many of its IBM compatibles are based on the older PCs and PC XTs. To make these machines capable of Mac-like graphics would require money for graphics cards, monitors and mouse add-ons. It is less expensive, he says, to buy a Mac rather than attempt to upgrade the older PCs.

By strictly limiting the applications that justify a Mac purchase, Heller has managed to avoid the Mac's proliferation throughout the firm and many of the problems caused by this growth. But another problem has arisen.

While the Mac can give users the new tools to produce graphics, it doesn't provide users with the necessary artistic judgment to use those tools correctly. Heller warns, "Just because you get someone a desktop publishing package does not make them a desktop publisher."



LES KASTNER

MIS' political voice

BY HELEN PIKE AND
MARK BREIBART
CW FOCUS STAFF

MIS managers and their staffs regularly venture into the unknown, seeking a search of solutions. With increasing frequency, they are drafting personal computing and connectivity plans that take into account a

larger system of computers and networks. The logistics may be daunting, but the rewards can be far-reaching for users.

This scenario has a corollary in the political arena. It, too, is a large unknown, requiring thoughtful analysis and networking to resolve the legislative issues affecting the DP/MIS field. The issues themselves may not receive more than a passing thought or two on Election Day. After all, there are budgets to get out.

But consider a 3M Corp.

MIS manager who is championing a statewide computer crime bill in Minnesota that would make unauthorized access to a computer system illegal. Or take

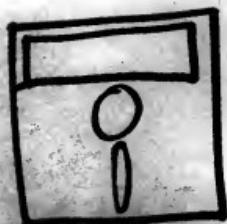
the founder of Automatic Data Processing Corp., in New Jersey, who has taken up the cause for computer education with a few to help schools incorporate computers into the curriculum. The former is Daryl Wegscheid, who also happens to be a two-term senator from the Democratic Farm Labor Union party. The latter is Frank Lauten-

berg, who is also a Democratic incumbent in the U.S. Senate.

These two elected officials aren't alone in altering the hierarchy of information technology. In many ways, DP/MIS professionals will be doing their job in the years to come.

Mary Tesser, technical training and administrative services manager for the Federal Reserve Bank in Minneapolis, channeled her community activism into her profession when the

Computing has no party affiliation in this election year.
Page 26.



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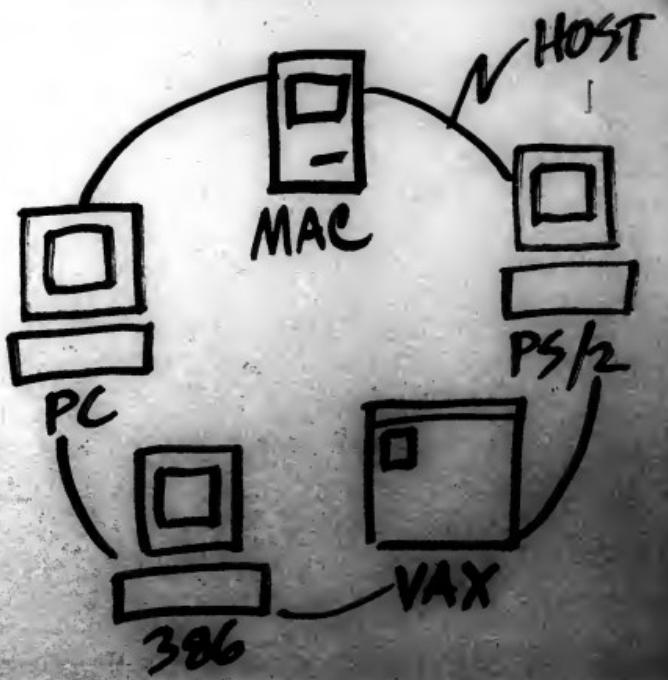
While this variety of solutions makes it easy for users to meet their needs, it presents some problems. Like sharing information between incompatible systems. The kinds of problems facing more and more companies as their information systems grow and diversify.

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MIS IN POLITICS

issue of computer crime started to become more prevalent in the field.

"Security issues are important to me, and they certainly are important to the Fed because it handles the nation's money," Tesser says. "Being a political type of person, I saw this as a chance to get involved and to get to know the system better."

There was nothing mysterious in how

Tesser got involved. For one, she was in the right place at the right time. As president of the local chapter of the Data Processing Management Association (DPMA) in Minneapolis, Tesser got the call from the national office in Park Ridge, Ill., asking her to testify on Webschel's computer crime bill. For another, she simply was interested. She saw it not as a burden on her time but as "a

tremendous opportunity to get involved in local legislation."

She also had the support of her company. The Fed considered the issue important enough to give her and its MIS security manager, Jim Dyrkofsk, all the time they needed. "It couldn't officially sponsor them — the Fed has a policy of noninvolvement in politics, so the two of them had to speak as members of the

DPMA — but it could and did support them indirectly.

Prior experience is not required for the job. Despite her involvement in local politics before working at the Fed, Tesser describes herself as a rookie. "When Joe Collins of the DPMA office called, I said, 'Sure,' but," she laughs, "he had to tell me what to say and which capitol to go to. I was so naive I didn't know if he was talking about Washington, D.C., or here."

Besides testifying at the Statehouse in Minneapolis, Tesser and two other local DPMA officers helped to draft the computer crime legislation. Working with Wegschel and Senate lawyers, they took the DPMA's Model Crime Act and tailored it to the local situation. That act defines the terms and sets penalties for computer crime (see story page 28).

They also "narrowed the scope so the senators and representatives could get their arms around the bill," Tesser recalls. "They are not technicians and don't understand a lot of the issues involved." The first part of the bill, for example, simply defines terms like "computer system," "network" and "information." Other words like "hacker" and "virus" were avoided because "it's difficult for nontechnical people to grasp what these concepts mean. It's often confusing to us," she adds.

The bill passed the state Senate but lost in the House. The process was an eye-opener for Tesser. When the DPMA cadre would go up to the capitol, the response seemed encouraging, Tesser says, but the effort wasn't successful. "Next year, we will do things differently," she promises.

Empower the members

The problem was that the DPMA officers had done it alone. Though keeping the general membership of their chapter fully informed, they had done all the leg-work. This year, they will try to get members involved in a letter-writing campaign, in a phone campaign and in discussions at the Statehouse. "We need to get everyone in DPMA involved much more," Tesser explains, "so their local reps will take it seriously."

Unlike the DPMA connection that got Tesser going, Tony Ezel got involved through his company, Transonic Inc. in Worcester, Pa. As DP manager for the aerospace government subcontractor, Ezel needs to track some specific legislation on cost accounting and inventory control for the affected government subcontractors directly.

He stayed involved. His immediate motivation was the discrimination he perceived against fellow MIS professionals in Section 1706 of the Tax Reform Act of 1986 (see story page 25). The problem, he says, is that "members generally don't understand the issues in the area of DP." Ezel and other members of the Montgomery County DPMA chapter in Pennsylvania wrote their congressmen on 1706, describing their position and how the section affected their business.

As part of a larger DPMA delegation, he has also gone to Washington, D.C., twice on what the DPMA calls "The Washington Focus" — because we focus our attention on government issues." The delegation's goal is to bring the lawmakers up to date on how DP views pending issues. Ezel says they are making progress. The year, the

Primary concern: Keep systems running

THE COMPUTER OPERATIONS of the two presidential campaigns are a breed apart from everyday MIS, even for those managers used to the hectic pressures that come, say, at the end of a fiscal year. Listen to Michael Thompson, the computer facilities manager for Bush-Quayle headquarters in Washington, D.C.: "What starts out as a business at zero dollars goes up to \$26 million dollars in just a few months, [then we spend it all] and then back down to zero again. At times, it borders on craziness around here, but it's part of the process."

One result of this kind of schedule is that the quick-and-dirty approach often wins out. The campaign staffs of Republican nominee George Bush and Democratic nominee Michael Dukakis handle the scheduling of their candidates and all the speakers out on the stump. "If this were a business, we would have had it all on a nice, multiuser system," Thompson says. "But we don't have the time, so people sit in close proximity, and they talk to each other a lot."

Another problem the campaign share is getting data base information to and from campaign offices in the 50 states. "We do it the hard way — by hand-load the data," says Pamela Lowry, director of computer operations at Dukakis-Bentsen headquarters in Boston. "We don't have time for fancier stuff."

In many other ways, though, what these computer operations do is pretty ordinary. Asking Lowry, for example, how the campaign uses computers "is a bit like asking a business how it uses telephones," she says. "The machines are everywhere; we use them for everything." As in most systems, that means word processing, spreadsheet and database applications.

It also means a lot of user support. At the Democratic office, Lowry is supporting 70 to 100 personal computers with a paid staff of seven. The Republican office has a staff of three people and what Thompson calls "knowledgeable users" to support a similarly sized fleet of PCs and 50 printers.

Standing behind these campaign operations are the Washington, D.C.-based corporate headquarters of the national committees of the two parties. With 20 to 30 staff members, these operations are larger than their presidential counterparts and more stable because they don't close shop after November. But the parties' national computer offices, too, face the political boom-bust cycle that is unique to their industry. "You have to understand," explains Michael Meyers, director of MIS for the Democratic National Committee (DNC), "this is not like a regular corporate environment" in which growth tends to be smoother.

In preparation for this year's boom period, Meyers' office had to expand substantially. When he took the job in late 1987, Meyers relates, the DNC had an IBM System/38 Model 6 with 4MB bytes of memory. He upgraded

to a System/38 Model 600 with 16MB bytes and added six experienced programmers/analysts and operators. He also doubled the disk space to 5.1GB bytes.

The system at the Republican National Committee (RNC) also had a major face-lift, according to Thomas Hofeller, the RNC's director of computer services. The RNC's Digital Equipment Corp. Vaxcluster is now in, with a DEC VAX 8600 and 8550, a total of 168MB bytes of memory and 4.2GB of disk space. In addition to replacing the older Decsystem-20 hardware, Hofeller's staff had to rewrite substantial chunks of software.

The production schedules required by the peak-load problem of quadrennial election years are also unusual, comparable with what utility companies do on a daily and seasonal basis. "In this heavy period," Hofeller explains, "the system will peak at about 90% to 95% of capacity. After November, you could probably shoot a shotgun through main memory and not hit my data." He operates according to a 70-30 rule. In an election year, about 70% of what his staff does is unplanned, reacting to the immediate, unpredictable needs of the campaign, while 30% is planned. In nonelection years, 30% is reactive and 70% is planned.

Despite the computing similarities of the two sides of the political street, the national committees reflect different philosophies about data processing. It's a difference that is echoed throughout MIS. The RNC operation centers on a single large system, with some smaller supporting systems. The DNC distributes its processing around networked systems.

"We're not heavily into PCs," the RNC's Hofeller states. "We need the mainframe for our production work. If we find specific uses, like desktop publishing and making visuals that a Mac can do well, we will do that way. But we mainly use the VAX." While he does have a Wang Laboratories, Inc. Wang VS 100 with about 85 terminals and printers, the machine is used strictly for word processing. And when he needed to add 50 to 60 more users, he put them on the VAX, not on a smaller system.

Over at the DNC, the System/38 handles fund-raising tasks, and a Sun Microsystems, Inc.-based network handles most of the other services. That network is the joint property of the DNC, the Democratic Congressional Committee and the Democratic Senatorial Committee. It has approximately 170 to 200 microcomputers over an Ethernet network to three Sun-3 Model 260s and a Sun-3 Model 160. The micros can also tie directly into the System/38 with an add-on card that emulates an IBM 5251 terminal.

Although they disagree on some of the technical decisions, the computer people at both political parties can probably agree on one thing. When this presidential election year comes to a close, life will get a lot quieter for them. — MARK BRENNAN

MIS IN POLITICS

DPMA originated the trip. The second year, the lawmakers asked them back. Etzel says he was "flattered the second year to find that some of the legislators remembered me from the first year."

Behind every messenger
Providing support for people like Texer and Etzel is the DPMA. Other vendor and professional groups, such as ADAPSO, the Data Entry Management Association and the Computer and Business Equipment Manufacturers Association, lobby or take positions on legislation that affects MIS. With about 30,000 members, however, the DPMA is the association of choice for most DP managers.

But for the DPMA, whose interests have focused on traditional professional activities, "lobbying is not a huge priority," says Joseph Collins, DPMA director of public affairs. There is no special interest group on government relations, for example, nor does it have an office or full-time lobbyist in Washington, D.C., as is common among other trade associations. It tends to concentrate on the state level from its headquarters in Park Ridge.

Collins, believing that more involvement in legislative affairs is needed, has helped spearhead DPMA initiatives. About five years ago, the association established a legislative network with about 300 chapters in the U.S. and Canada. In each of these areas, Collins says, "there is a designated DPMA member to fill in other local members about legislation that members are or should be interested in."

Collins produces a monthly newsletter for the network, "Legislative Network Briefs," that tracks legislation on the state and federal levels and discusses the DPMA's position. A recent issue, for example, briefly describes the 12 bills in 11 states dealing with computer crime. When members get involved with a bill, Collins and the DPMA help coordinate their efforts, provide them with background information and even help them with specific testimony.

Even more attention to governmental affairs would be good, Collins says. "The industry is so young and volatile that it may be more vulnerable to political issues." Government people are often "unaware of what all the issues are, because the issues

are not yet established," he explains. He does think that DPMA members are getting more interested and, as the issues develop,

The FOLLOWING is a list of the addresses and phone numbers of some of the computer industry's trade associations:

The Data Entry Management Association, 101 Merritt 7, Norwalk, Conn. 06851. Provides information to managers involved in both traditional and emerging methods of data entry, such as key-to-disk, on-line and distributed processing, voice entry, personal computers and word processing. (203) 846-3777.

ADAPSO (Computer Software and Services Industries Association), 1300 North 17th St., Arlington, Va. 22209. Provides software and service firm members with programs in research statistics, government relations, joint purchasing, legal support, public relations, international marketing and management. (703) 522-5055.

Computer and Business Equipment Manufacturers Association, Suite 500, 311 First St., N.W., Washington, D.C. 20001. Identifies and resolves issues of importance to the industry and supports the development of industry standards. (202) 737-8888.

The Computer and Communications Industry Association, 665 11th St., N.W., Washington, D.C. 20001. Participates in national policy debates on issues that determine the environment in which member companies compete. (202) 783-0070.

Independent Computer Consultants Association, P.O. Box 27412, St. Louis, Mo. 63130. A national network of computer consultants who exchange ideas and concepts. (314) 997-4633.

are not yet established," he explains. He does think that DPMA members are getting more interested and, as the issues develop,

he sees them becoming more involved.

That is the case with Jim Stace. A self-described "old-timer"

"Stace has been involved in the DPMA for 25 years, including time spent as the organization's director. Now working as

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the MIS director of City Hall in Somerville, Mass., Stace first got involved with legislation in the early '80s, because I felt there wasn't enough legislation and monitoring relative to the computer industry."

At that time, there were no legal remedies for computer

crime, a realization he found out the hard way. Stace caught someone breaking into a computer system and defrauding the company for which he was then working. "But there wasn't any legislation around to convict him, so he had his hand slapped and was let go. That got me go-

ing," Stace says.

Since then, he has been involved in various bills, ranging from 1706 to the software sales tax to VDT safety. He reports his findings through the legislative network and to his local Boston DPMA chapter. The chapter, with a membership of 235,

discusses legislative issues at board meetings and then at general meetings at which "60 is a good head count." When asked if other members are interested, Stace pauses before answering. "I guess so," he says. "There's some interest but nothing very strong."

That, however, is clearly not enough for him. "There needs to be a voice representing the computer industry... If I was going to be part of this industry, part of the profession — and I have been for a lifetime — I thought we should be heard in a democratic way."

MIS-related concerns pepper state, national legislation

BILLS THAT AFFECT MIS dot legislative dockets around the country. They range from computer education bills and research and development tax credit provisions whose impact will be felt only in the long term, to computer crime legislation or the taxation of custom software and computer services whose implications are more immediate. What follows is a snapshot of some of the state and national issues:

- **The Lubricon case.** In a 1985 court case, *Lubricon v. Richmond Metal Finishers*, the unexpected happened to Lubricon Enterprises, Inc., a metal finishing company in Ohio. According to Ted Heydinger, vice-president of CREMA, Lubricon had licensed a metal finishing process from Richmond Metal Finishers, Inc. When Richmond Metal declared bankruptcy, the bankruptcy trustee took the license away from Lubricon, and a federal appellate court upheld the action. The implication to MIS, Heydinger explains, is that "you, as a licensee for a manufacturing process, or product or for software, can get caught out in the cold, unable to use it anymore."

Herb Wamsley, executive director of the Intellectual Property Owners Association (IPOA), says that since that court decision, "the presence of Lubricon has had a chilling effect" among companies buying licensed products. It's particularly relevant, he points out, "given the large number of small software creators and the large number of bankruptcies." By slowing down the making of deals, he claims, Lubricon is "bad for the industry, because the best way to make technology advance is to get it to diffuse quickly."

Concerned groups, such as CREMA, the IPOA and ADAPSO, formed a coalition to overturn the court decision through legislation. The bill, which resulted from much lobbying in Congress and long discussions with the legal community, was passed by both houses in October.

- **Computer crime.** If you have a security system on your computer, your data should be legally protected from intruders. That's the thrust of a computer crime bill introduced in Minnesota, according to Mary Texer, manager of technical training and administrative services at the Minneapolis Federal Reserve Bank and president of the local DPMA chapter in 1986.

Whether it's on a personal computer or a large network, whether it's perpetrated by a hacker looking for kicks or someone looking to defraud or wreck havoc, unauthorized access and unauthorized use of computer data would become a crime under this legislation. In addition, the bill sets penalties ranging from misdemeanor to felony and includes

jail sentences and fines.

The bill, sponsored by state Senator Darril Wegscheid, who is also a DP manager at 3M Corp., is based on the Model Computer Crime Act written by the DPMA. Texer and other members of the local DPMA chapter worked with Wegscheid to tailor it to Minnesota, which already had another security bill relating to computer hardware on the books. The bill passed the state Senate but was rejected by the House. Texer says they will try again next year.

The legislative push in Minnesota has company elsewhere. New computer crime legislation, to go along with bills already passed, is in the legislative hopper of at least 10 other states, according to the DPMA.

- **Telephone tariffs.** Worrying about phone bills is not a glamorous part of a DP manager's job, but as outlay of hundreds of millions of dollars cannot be ignored, Brian Moir, counsel for the International Communications Association (ICA) says that amount is what businesses have been overcharged during the past three years on the access rates they paid to connect long-distance lines to local phone networks. DP managers should be particularly interested, he reports, because the private-line circuits involved are primarily data circuits.

For three years, some of the carriers charged high-capacity services up to three times the rate set by the Federal Communications Commission and lowered the rates on other services so their total return was within FCC guidelines, Moir says. The regulatory agency is investigating the discrepancy but is dragging its heels to protect the carriers, he charges.

The ICA has lobbied Congress to amend part of the FCC Authorization Bill. It wants to limit the amount of time investigations can take and make it easier to take the FCC to court, where its rulings can be challenged. The legislation, Moir adds, "could even involve refunds."

- **Section 1706.** As part of the Tax Reform Act of 1986, Section 1706 tightened the tests consultants have to pass to prove their status as independent contractors.

By making it more difficult to be an independent consultant, Section 1706 hurts information managers, according to Joseph Collins, the DPMA's director of public affairs. "The issue for DP people," Collins says, "is that they like being able to hire consultants on a temporary basis. It gives them flexibility and means they don't have to pay full benefits." The DPMA and other groups have tried to amend the bill but have failed.

However, some in the computer services industry like the legislation. ADAPSO, which represents professional service firms brokering from two to 2,000 consultants, thinks Section 1706 is fine without the proposed amendments. According to ADAPSO Vice-President Mary Jane Saunders, "1706 essentially corrected a tax loophole. Now we have a law that's clear, a law that's being enforced."

But others say the root of the issue is that different players in the consulting marketplace have different interests. Jack Christensen, executive director of the Independent Computer Consultants Association, one of the groups opposing the bill, claims that, historically, "large service industry companies employed the programmers, paying them all the employee benefits. They never liked the fact that consultants can go out and market themselves to DP clients more cheaply than the large brokers can." Section 1706, he reports, could change that.

- **VDT use legislation.** In June, the legislature in New York's Suffolk County passed the country's first law to directly regulate VDT use in the private sector. Related legislation has been introduced in 15 other states without success, says David Legrade, director of safety and health at the Communications Workers of America (CWA), a main supporter of VDT regulation.

Though the CWA will continue to push the legislation, Legrade is not optimistic it will pass elsewhere. "Without good strong data [on the health and safety issues], we won't be able to counter industry, which is out there in full force." Nevertheless, the District 1 local of the CWA involved in Suffolk County may try to test the waters in several counties in upstate New York.

The VDT bill, whose provisions will go into effect in Long Island County during the next two years, applies only to businesses using 20 or more computers and to operators who work at terminals at least 26 hours a week, according to "VDT News," a newsletter published in New York. The law sets ergonomic standards for workstations and work areas and requires employers to provide rest breaks and pay for 80% of the cost of eye exams and glasses.

Unlike the 1706 provision, computer industry groups agree on this one. "Our members like the intention of the law to make the workplace safer," says Chet Marchwinski, editor of the Data Entry Management Association's newsletter, "but they are worried about the cost. Some have already implemented some of the features of the law and want to do it at their own pace." — MARK BIEHN

The dynamics of downsizing

BY STAN KOLODZIEJ

Oh, what webs we weave. Not all of them are tangled, however. There are success stories out there of corporations that have left all or a good part of their mainframes behind and taken a chance on local-area networks.

Taking a chance on personal computer LANs is probably not too strong a statement to make. After all, mainframes and minicomputers are still icons of U.S. corporate computing and abandoning them is not an easy choice for MIS, despite all the benefits of that decision — the

economic lure of lower processing and maintenance costs associated with personal computer networks, relieved from the pressure of getting the guts of computing closer to users and the markedly better LAN software and support that has entered the market in the past two years.

"It wasn't an easy decision," agrees Don Simpson, former director of information services and purchasing at Texas City Refining, Inc., in Texas City, Texas, and now the MIS director of the New England energy company that recently bought Texas City Refining. "But we were paying \$700,000 a year to maintain our [Sperry Corp. 1100] mainframe and \$80,000 a year just on the [mainframe's] terminals. That was a good reason to start looking at alternate technologies."

Simpson lists other reasons that helped point him in the direction of PC LANs.

"Most of the engineers we were hiring directly from school were PC literate, and there was a lot of them that were carrying both PCs and terminals," Simpson says. "It was awkward, and it was creating a duplication of costs."

Simpson adds that Texas City Refining was starting to spend a good deal of money putting in PCs and then running cable into multiplexers.

"It's difficult and costly to wire devices into multiplexers," Simpson explains. "We had about 75 PCs scattered throughout the refinery, and it was costing \$700 to put in a special [mainframe link] card and all the cabling that went with it."

On the other hand, Simpson says, he could plug a PC network card into a micro for \$500, adding that cabling is much easier.



or a network environment than it is in the natural gas refinery's hardware-defined environment.

With such sound economic reasoning in tow, Simpson approached his superiors with a plan to replace the mainframe with a PC LAN. He says there wasn't much room for argument.

"If you saw what we were doing, it was pretty incredible," Simpson says. "I've been in this business 17 years, and I was surprised because the worst case scenario wasn't had at all. The worst case was that I would spend \$94,000 and save \$80,000 a year. So the payback [time] was a little over a year."

The most likely case was that not only would I do that, but I would also be able to [link] our [Digital Equipment

Corp.] VAX computers."

The best case was replacing the Sperry mainframe and putting more Intel Corp. 40386 processor-based micros in the plant at a one-time cost of less than \$200,000. That would leave the company way ahead of the game, Simpson maintains. Any way Simpson looked, it was a win-win situation.

In the end, management gave Simpson its OK on the LAN strategy.

"The first priority was to replace the mainframe terminals," Simpson explains. "We spent the \$94,000 to put 75 PCs on a network. The price included the laying of all the cable, all the network cards and all the software. It also included the file servers, the communications servers, the fiber-optic links and the repeater."

The network would extend from near-by Texas City Refining administration buildings to the refinery. Simpson first installed an Ethernet backbone network in the administration building. Connected to this backbone were what he called six "cheaper net" or less-expensive Ethernet-compatible wiring networks. Because of the distance limitation of 3,280 feet inherent in Ethernet cabling, Simpson decided to use fiber-optic cable to extend the network trunk into the refinery, which is almost a mile and a half from the farthest administration building. In all, he had 32 fiber-optic links running to the refinery, at which point they connected with another 3Com Corp. Ethernet network.

Simpson says Texas City Refining's in-house engineers were able to install all the cabling and now handle PC and LAN maintenance.

However, for the remainder of the project, the company turned to networking vendors. The choice of LAN vendors

Kolodziej is Computerworld's senior editor.

MAINFRAME EXODUS

was short-listed to 3Com and Novell, Inc.

"At one point, we had three different Novell dealers come in, and not one of them could get the complete network up and running," Simpson maintains.

"They didn't have full NetBios support, and that was preventing us from getting to our Sperry mainframe," he explains. "I brought in one 3Com dealer, and in one day he managed to accomplish what three Novell dealers couldn't accomplish in 30 days."

Down to the wire

However, 3Com also had some drawbacks, Simpson says. For one thing, the company's emphasis on Ethernet with its distance limitations restricted Simpson's options for wiring the refinery. Novell offered more wiring alternatives, "but the dealers didn't come through," he explains.

There are now about 120 nodes on the refinery network, mostly a mixture of Tandy Corp., 386-based machines and IBM Personal Computer AT's and XT's. All of these access and analyze data from the two mid-range DEC VAXes, which monitor refinery operations. The LAN workstations use software rewritten by Simpson from the mainframe to the LAN.

In the meantime, the five-year lease on the mainframe expired during the summer, and the management team reluctantly had to be moved back to Unisys Corp., of which Sperry is now a part. The refinery LAN is on its own and running without a hitch, according to Simpson and his replacement at Texas City Refining, Ronald Mason.

However, Simpson qualifies the success and independence of the LAN installation somewhat, in light of certain events.

The past summer, a New England-based energy company purchased Texas City Refining.

The new owners reduced the number of Texas City Refining administration employees by 130, decided against renewing the lease on the Sperry mainframe and moved all Texas City accounting systems to the corporate mainframe in New England, "Simpson explains.

But Simpson's selling job wasn't quite over. He still had to sell his old bosses and the company's MIS culture on the cost of a major operation on a LAN, something that was not quite clear, Simpson says.

"We did intense investigation, we did some benchmarks to prove that our technology would handle the [processing] load and we developed some of our own software tools that would help manage the network better," Simpson explains. "In the end, we convinced them that a PC network could handle the load."

Using Micromic, Inc.'s R/Base for DOS software, Simp-

son and his staff wrote several accounting and refinery programs that run on the network, part of a total that Simpson now estimates to be close to 100 processors.

"One of the secrets, I think, is to look at the network as a mainframe," Simpson explains. "Every PC is in and of itself its own processor, and the chances of 100 processors being down is pretty slim."

Instead of installing a single large file server, Simpson permits users to opt to install their own file servers because they could locate their network connection, which becomes the most important link on the network he says.

"We decided to locate all programs locally on a [network] machine, which is why we have not installed anything less than an XT in power," Simpson says. "For example, if I need 100 copies of [Lotus Development Corp.'s] 1-2-3, I buy 100 copies of 1-2-3, and I put it on every machine, and I don't have to pay for the price of all the program fetches over the cable."

"If you get into very heavily overlay-driven software like R/Base for DOS and [Alderson Corp.'s] DBase 3 Plus, and you get even 20 or 30 users trying to share that program, you're beaten. You're putting a lot of fitting or program overhead on the cable, which burns the cable," Simpson explains.

"One of the secrets, I think, is to look at the network as a mainframe. Every PC is in and of itself its own processor, and the chances of 100 processors being down is pretty slim."

DON SIMPSON
MIS DIRECTOR OF A NEW ENGLAND ENERGY COMPANY

"You're also putting a heavy contention on a UU device being a file server. If you put the software out on the local network machines, that problem completely disappears from the network because users can work at higher local speeds."

In Texas Refining's case, not all the LAN sailing was smooth, however. One hurdle was accumulating 100 users.

"There was a significant training curve to overcome — how to get on the network, how to use spreadsheets, how to use a word processor. We had to develop an in-house training program. Suddenly, we were expected to solve all their problems. That took away some of our [software] development focus for awhile," Simpson concedes.

Other problems included monitoring the network. On a mainframe, he explains, there are lots of software tools to aid operators in gauging the processing burden on the machine.

"On a PC network, there aren't as many tools, so it's hard-

er to know when you're overburdening a file server or a cable and how many applications it's possible to put on a network," Simpson says, although he adds that both 3Com and some third-party software packages provide adequate on-line data scopes to monitor network capacity.

"I've been told that in the Ethernet environment, if you put a 25% to 40% load on the cable, you're probably going to notice irregular response time," Simpson explains. "When I left Texas City Refining, we were seeing an average response on the cable of between 5% and 7%, with peaks at 11% and 12%. The networks still have a lot of capacity left."

To expand the Texas City Refining network, Simpson explains, it would be a simple case of plugging in another server, but he warns that such a move will not work for every LAN.

"For example, if your LAN files are too large, there could be so many transactions in a data base that a second server might not help," Simpson says. "You might need to boost the disk space. In our case, we determined beforehand that none of our files were going to be so big that they would go over the 32-Mbyte file server limitation."

"And where there might be a problem, we figured it out and designed ways to get around it, because you can segment data, and with the data being in a re-

labeled

data base, that [process] is very easy to do."

As a result, Simpson reports that Texas City Refining has had no problems holding heavy data on the network.

Heavy volumes of data are the bread and butter of a Warden, Conn.-based small-order company called Advo System, Inc. According to Norm Turnbull, project manager at Advo System, the firm's IBM 3090 E mainframe in its Hartford, Conn., headquarters handles a database of 95 million residential addresses placed in alphabetical order. Within that database reside Advo Systems software called the Market Finder System. Turnbull says the software can arrange the company's data into demographic information covering approximately 190 categories.

The data is stored on 800MB hard disks and 300MB-byte core mainframe drives, and there is more data stored on optical disks.

The problem, Turnbull ex-

plains, was too much data that was too centralized. What Advo System wanted to do was distribute the data and make it on-line, immediate and more accessible to its branch managers, who make sales pitches to potential multi-order clients in the field.

Installing remote mainframe terminals was not going to do it; managers needed the intelligence of PCs to store, access and manage large amounts of data on the spot, Turnbull says.

Advo Systems looked to LANs. It installed a 25-workstation Novell LAN in Columbia, Md., subsequently adding another nine-node Novell network in Los Angeles, both of which are located in two of Advo System's regional research centers.

Quick download

Turnbull says that data can be downloaded quickly from the Hartford mainframe onto one of the LAN server's PC disk drives. Most Market Finder LAN files are still relatively small, only about 25MB bytes, but Turnbull says there are several ancillary files that can be accessed from miniframe storage tapes, print-massaged and put onto LAN PCs. That option can account for approximately another 45MB bytes of data for each network.

Market Finder software also runs on stand-alone PCs at six separate Advo System branches, where the data is deposited on 115MB-byte PC hard drives.

The LAN server PCs have two. Two of the file servers at the Columbia installation, for example, are 20-MHz Compaq Computer Corp. machines running 300MB-byte core drives.

The salesmen use the LAN data to create a booklet that they bring to clients. "Turnbull explains. "The booklet contains a plotter-created map showing a state's ZIP code area, where a store is located, with a radius circled in. There is also a page attached showing associated ZIP codes with mailing lists, so the client can see exactly where his mailing is going to be sent and [what] mailing options [are] available within various radius."

"What it's done for Advo Systems in areas such as the South is bring in clients that we haven't had a shot at before because we didn't have certain information on our finger tips," Turnbull claims.

Not everyone with Advo System has found the LAN approach, however.

"In any company, you have those who are for micros and others who are for mainframes," Turnbull explains. "We're no exception. Try to have a balanced approach, and that means we don't have real big plans right now for our LANs."

That may be true for Advo System, but at energy consulting firm American Management

Systems, Inc.'s (AMS) Houston office, there are big plans in store for a year-old LAN.

When Arlington, Va.-based AMS decided to set up an office in Houston a few years ago, it sent to the site some MIS staff members who decided that instead of installing a minicomputer or mainframe, they would instead set up a LAN like the one they had previously set up in Arlington.

"We followed in Arlington's footsteps," explains Stephen Kligo, a principal at the Houston MIS office. "At first, the head office used a LAN system exclusively for spreadsheet, accounting functions and the usual [LAN] applications. That's what we did. Now they are starting to use the LAN to build CASE products for their clients. That's what we want to do for our clients in the gas and oil business."

More specifically, Kligo explains, the AMS head office has been using AMS' own mainframe-based Core Foundation Software development program and such products as Micro Focus, Inc.'s Micro Focus Cobol and various debugging tools to pare Core down to a PC-based computer-aided software engineering (CASE) product.

"They're actually doing the development and maintenance of the PC-based Core product right on PCs at the LAN, not on the mainframe," Kligo claims of the MIS staff members at headquarters. "For most of the final testing and implementation of that product, however, they will still will pass it over to the mainframe."

Kligo says the Houston staff soon began to follow the same path and develop PC-based CASE products on its 30-user Ethernet-based LAN that the staff installed.

Worries of caution

Despite apparent pluses, none of the three companies listed above have any immediate plans to jump into a corporatewide, wholesale push toward PC LANs. Simpson, Kligo and Turnbull will describe their companies' approach to PC-based networks as optimistic but tinged with caution, building gradually on each LAN success.

In general, it appears the MIS mind-set still has some MIS managers feeling uneasy moving from their experience with mainframes and other large systems. "It takes time," claims Jim Perini, chief executive officer of IMRS, Inc., a Stamford, Conn., developer of both PC and large systems-based financial-based software. "My experience with large systems people know the LAN and PC technology has been in place for a few years now. That's not the issue anymore. Now it's a psychological issue. MIS is only slowly accepting the fact that PCs can now do the job of a mainframe."



Backdoor LANs

*How
to manage
unsanctioned
networks*

BY MARC CECERE

Once stand-alone personal computer users are given access to a local-area network, controlling them is like trying to corral fish within a picket fence. Industry research company Forrester Research, Inc. recently stated that by 1992, 35% of PCs sold will be networked. Forrester's "LAN Futures" report claims that within the Fortune 1,000, 55% to 60% of new PCs acquired in 1992 will be connected to LANs. Furthermore, another study by the Cambridge, Mass.-based

organization concludes that by 1992, 30% to 40% of applications will be created outside of MIS influence. LANs are proliferating, and MIS is losing control.

LANs are more often than not brought in by a group with a communications problem looking for an immediate solution. This group doesn't care much about corporate communications policies and often looks at the MIS department as something to be worked around. The major problems with these renegade LANs appear afterward, when users find that the mass of cables, boards, software and hardware requires considerable care and feeding.

The following are some of the problems that arise when LANs get out of hand:

- **Incompatible software and hardware.** One government agency was employing five different and largely incompatible LAN protocol services from four different vendors, a smorgasbord of applications software and an unknown number of monitoring and control systems. Network problems solving and support required the help of several groups, each specializing in its own LAN. Because of incompatibilities, documents were shared by printing copies, transporting them using interoffice mail and relaying them into another host.
- **Ironically, users blessed the MIS group for this mess, though most of the LANs were backdoor LANs brought in by resourceful employees successfully circumventing what they felt were MIS's restrictive and time-consuming purchasing policies.**
- **Redundancy in installation and maintenance.** The procedures for installing and maintaining different LANs, PCs and so on will vary, requiring more support staff and training.

Cecere is a voice and data communications consultant at Technology Concepts, Inc., a Bell Atlantic Corp. company headquartered in Sudbury, Mass., that specializes in communications consulting, software engineering, technology seminars and training and software products.

RENEGADE LANs

- Redundancy in training.** PCs on a LAN are increasingly using applications that interweave with LAN software. Communications and applications training need to be supported together. Unfortunately, because user training is often a low priority, users are many times faced with inadequate training in the use of both the applications and the expensive communications tools. They end up becoming familiar with only the bare minimum of functions required to do their jobs. The result is inefficiency and a questioning of LANs' usefulness.
- No group leverage in system purchases.** Giving groups of MIS and users the corporate clout to be involved in system purchases is useful when network

problems occur that require vendor assistance and when quick turnaround time is required on an order because of the pressure groups can exert.

- Minimal user input to MIS.** If MIS cannot manage the network resources, users will be less inclined to offer the input that MIS requires to provide corporate solutions.

- Bootleg software.** Without oversight, illegal copies will inevitably appear.

- Erosion of MIS responsibilities.** The sum of all the aforementioned problems is that MIS will lose control of LANs and the computers they link.

Faced with such problems, MIS departments have frequently taken one of two tacks. Some have cracked down on

backdoor LANs and taken strict and complete control of data communications and data processing. Others have thrown up their hands in despair and let users run their own networks.

MIS managers who tighten the controls on LANs often do so by lengthening and enforcing signature cycles, generating approved lists from which users can select systems, eliminating loopholes for unapproved purchases and identifying detailed requirements for all communications purchases.

One insurance company on the East Coast, realizing its LANs were getting out of control, set up such strict guidelines. All LANs had to be IBM Token-Rings, all word processing, spreadsheet

and communications software had to be bought from one vendor and a corporate standard workstation was mandatory. The firm then went a step further and defined a standard format for memos, reports and exhibits. The result of these good intentions was a network barely used, dissatisfied users taking pride in finding creative ways around the data processing tools, illegal software and as MIS staff often ignored and scorned.

The opposite case is that of a university in the state of New York that allowed individual colleges to manage their LANs in whatever way they wanted. The colleges, liking the autonomy but not really wanting to operate networks, left the users to their own devices. The result of this laissez-faire management resulted in many small MIS departments, virtually no electronic connectivity between working groups (other than some terminal emulators) and heated turf wars between the small departments.

Clearly, neither of these examples is the right strategy. MIS must ensure that it does not fall into either trap by keeping in mind certain goals. Not only should MIS strive to provide cradle-to-grave

Not only should MIS strive to provide cradle-to-grave support, but it should also have knowledge of all LAN and related purchases.

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RENEGADE LANs

- Provide templates. Templates are guides used to create memos, write reports and make presentations. The templates will often include a company logo, the appropriate spacing, margins, page numbers and the commands to create a table of contents. These tools let users focus on the creative parts of their jobs rather than on the formating mechanics.

Creating these templates means sitting down with users and talking about their requirements. Old copies of reports, slide shows and so on are a good starting point for discussion, but improved versions of these items should be included to show users how they can produce better products as well as work more efficiently and creatively.

Templates will greatly encourage users to use the network and allow a central authority some measure of control. Templates tell users that the MIS department is out to make their jobs easier.

- Set up libraries of boilerplate material. These libraries are on-line files organized with logically named directories containing material to be used in proposals, presentations, reports and so on. The material may include biographies of employees, company background data, templates and organization charts. Mechanics should be in place for users to create their own libraries. MIS-filtered versions of these homegrown libraries can be incorporated into the central library.

As with templates, libraries are the goodwill ambassadors of the MIS department. If done right, they show that MIS can be trusted and that centralization of access to data is not necessarily bad.

- Set up a single point of contact. The point of contact can be a phone number or, in small firms, a person who maintains control of a problem. This contact point does not necessarily solve a problem but is responsible for trying to get a resolution and for keeping the user informed of status. Status reporting is often overlooked but is one of the easier ways of making allies.

- Respond quickly to requests. The most common terms used regarding MIS involvement with LANs is "roadblock" and "bottleneck." The opposite should be true. To get users to say their MIS department "greases the slides," it must set up mechanisms for quick purchases.

- Encourage users to experiment. Users can be the most active sources of innovation. Tinkerers should be allowed to tinker even though it will be necessary to provide some insulation for operational LANs. This may require filtering bridges or even separate experimental networks. The point is that these tinkerers should not be orphaned simply because they are a little bit out of the mainstream. They should be supported and encouraged to show what they develop or learn with MIS.

- Invest in a network management scheme. Ideally, this would be a system that manages voice and data communications systems as well as PCs, minicomputers and mainframes. The payback from such a system in terms of reduced manpower, faster response time and maximization of resources can be enormous. Unfortunately, the disjointed state of network and system management dictates that any integration will come from a mixture of procedures and systems.

Currently, there are management systems that focus on a single vendor's product with little available for crossing ven-

tor boundaries. To provide this cross-vendor management, manual procedures need to be in place to determine such items as network topology, the source of excessive retransmissions and the number of users accessing a host. It is through people using a variety of monitoring and control systems and then interacting with each other that the management of LANs will be accomplished.

- Be involved in mainstream business. The more MIS is actively involved in the primary business of the company, the greater the benefit to the company. In effect, the network becomes more than a utility. For example, DEC makes extensive use of its internal LANs and wide-area networks for research, de-

velopment and in sales as demo sites. In manufacturing, General Motors Corp.'s LANs are used to connect robots and processors for just-in-time manufacturing.

MIS managers should not get so bogged down in tactical fire fighting that they miss these strategic possibilities. A survey by United Research Co. in Morristown, N.J., showed that of 286 chief executive officers surveyed, 69% felt that the success of their companies was closely linked to their ability to gain a competitive advantage using information systems. To exploit this opportunity, MIS can no longer depend upon its function as separate from that of the company. It must become more involved as a tool of business rather than merely as a utility.

Gradually, these manual procedures



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Science projects

Schools experiment with networks for business

BY STAN KOLODZIEJ

A number of the industry's best and brightest network technologies have come out of this country's colleges and universities. As the 1990s approach, more computer vendors will be looking to graduate these networks from the environs of academia to the fast pace of the business world.

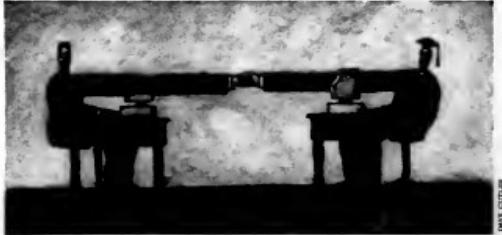
The relationship between U.S. universities and computer companies

has always been a close one. Rex Krueger, vice-president of Higher Education Marketing at Control Data Corp. in Minneapolis, for example, says that his company has been working with universities on research projects dating from the 1950s, starting with the University of Illinois and computer-based education and, more recently, with the creation of an extensive engineering network linking various universities such as Purdue and MIT. This kind of research has resulted, Krueger says, in network software products such as the Metaphor user interface system being incorporated into Control Data's recently introduced Transparent Computing Environment.

Krueger's company is not alone.

"It's typical of companies to go to universities and develop products," Krueger explains. "The risks seem a little lower than in the private sector, and if you do fail, it's not necessarily with a crash," he continues, alluding to the harsher glare of publicity that can dog product development in the private sector.

Kolodziej is *Computerworld Focus'* senior editor.



DAVE CUTTER

NETWORK RESEARCH

Whatever the reasons, the interaction between the private sector and universities seems to be heating up, with networking research and development making up a big chunk of this relationship.

IBM, for example, is now working with Merit, Inc., a networked consortium of Michigan universities, on a large-scale project to revamp the National Science Foundation's (NSF) NSFnet national backbone network, which links supercomputer facilities at research centers across the U.S. Prior to the IBM deal, Merit was awarded \$14 million alone in 1987 by the NSF to upgrade and supervise the operation of NSFnet for five years.

The original NSFnet, based on 56K bit/sec. dedicated AT&T Dataphone Digital Service links, was thought to be too limited for NSFnet's expanding user base; while the NSF says increased by approximately 200% in 1987 alone. The upgraded network will clip along at 1.544M bit/sec. and will also provide access to seven regional research networks as well as the six current supercomputing centers.

To handle the increased volume, NSFnet will run over T1 fiber-optic networks and microwave links, and upgraded T3 technology of up to 45M bit/sec. might also be used in the future.

IBM has been subcontracted by Merit to provide the software and hardware for packet-switching systems at the super-computing and regional network centers. What IBM gets from this undertaking is not just monetary rewards, however.

NSFnet uses the Transmission Control Protocol/Internet Protocol (TCP/IP) set of transmission standards. TCP/IP, developed in the 1970s by the U.S. Defense Advanced Research Projects Agency (DARPA), has left the scientific/research community to become a major commercial networking success and migration path to the Open Systems Interconnection (OSI) standard.

Both TCP/IP and OSI are going to be major vehicles in the movement toward large corporations integrating their multivendor systems, and an important part of such network integration is going to be network management, the brain center of large-scale, enterprise-wide networking.

What's in it for me?

And here's the Big Blue payoff: IBM has made no secret that it intends to use its NSFnet experience as an important R&D opportunity to fine-tune its Netview network management system for TCP/IP and OSI use.

Professor Douglas Van Houweling, vice provost of information technology at the University of Michigan, which is a Merit member and an NSFnet user, says he thinks streamlining Netview is IBM's biggest goal.

"The first goal is for IBM to develop technology that allows it to provide and be strongly connected to networks using the DARPA protocols," Van Houweling says. "Coming up with the switching technology and the processors that will back it up is important, and a natural extension of

that would be to extend its Netview/PC to manage such networks."

Why did IBM — and not AT&T or some other telecommunications company — get the NSFnet switching contract?

"Let me make it clear that Merit approached IBM, not the other way around," Van Houweling explains. "We had earlier conversations with AT&T about those [switching] issues, both with regard to regional and national networking, and while some interest was expressed, it was never very strong."

"AT&T, Northern Telecom and the standard telecommunications carriers tend not to have expertise in TCP/IP switching," Van Houweling maintains. "So we needed a computer company in this business, and it was clear we needed a computer company with some resources to invest. It was evident from budget projections with the NSF solicitation that the NSF was not in a position to make a major investment in technology."

Eric Asperre, director of the Merit Computer Network, explains that Merit's internal data network carries a great deal of packet-switching equipment, the software and hardware of which Merit has developed on its own during the years. Merit itself is bound to benefit from any advances in packet switching.

"There are 30 of our larger packet switches and 240 smaller packet switches along with 270 nodes in Merit that stretch across Michigan," Asperre says. "Therefore, much of the NSFnet switching development will also find its way to Merit's own network."

IBM already has some preliminary TCP/IP management software in place that runs on IBM's RT Personal Computers and implements the X Window network user interface developed at MIT. IBM's network management software runs under TCP/IP's Simple Gateway Management Protocol but is only the first step toward the kind of extensive TCP/IP network management system at which IBM is aiming.

According to Eileen Hancock, general manager of IBM's Communications Systems Division, the NSF network project will pay the company big dividends later on. In talking with Hancock, a bigger networking picture emerges.

"Our agreement with NSF is that we will use that same network management support to migrate NSFnet from TCP/IP to OSI," she says, adding that IBM will provide OSI support for its Application System/400 minicomputer line.

Already supporting TCP/IP under IBM's VM operating system, the company recently migrated the protocol to IBM's new system MVS operating system, a trademark of the company's System Network Architecture (SNA), Hancock says.

The NSFnet project will no doubt help IBM position Network as the network management link bridging its de facto and official standards networking environments: SNA first, then TCP/IP and, eventually, OSI. Seen in this light, IBM's work with NSFnet could play a big part in its commercial product strategy.

IBM also has its research fingers in the Andrew File System, a high-speed file exchange network that it is co-developing with the Information Technology Center at Pittsburgh's Carnegie-Mellon University. The Andrew File System will involve special software protocols and a high-speed network that will initially connect

to at least 10 sites outside the university.

The Andrew File System network is a mixture of Ethernet and IBM-supplied Token-Rings tied together by network bridges. It uses Sun Microsystems, Inc. workstations, IBM RT PCs and Digital Equipment Corp. VAXs as file servers. The LANs are connected to the backbone network by fiber-optic links running from the university building to Carnegie Mellon's University Computer Center building. TCP/IP network protocols are used for transmission. There are currently almost 1,000 campus workstations connected to the Andrew File System network.

The Andrew File System is part of a larger collaborative effort of software projects called Project Andrew, started in 1982 and funded by IBM. Project Andrew's charter has been to build a prototype university computing environment.

Under the Project Andrew umbrella, Andrew File System software finds a place beside other such research concerns as user interfaces (involving object-oriented kits for building user interface applications), windowing systems, document editors and messaging systems.

Alfred Spector, director of the Information Technology Center, claims that the Andrew File System is superior in features to other file transfer systems on the market.

First, the [Andrew File System] interface system uses more caching of information on local workstations to reduce the network load by less frequently having to go to remote servers, says Spector. He explains, "It also reduces delays to users because they have local data, rather than having to continually refresh it from the file system."

Spector says that the Andrew File System also contains protocols designed to run over long-haul networks, enabling them to stream data at very high rates.

"We've experimented and attained streaming rates of close to 400K bit/sec. between here and MIT across the NSF net," Spector claims.

In step with this research, Spector says he does not feel that research like the Andrew File System is too far ahead of market needs.

"I think our [file] system is larger than most people are selling today, but that doesn't mean it's bigger than the needs of companies," Spector reasons. "If you're General Motors and you have a number of divisions and you have accounting people in all divisions, there's every reason to believe that one would want to have all of those divisions, even if some are located in Pontiac, Mich., and some in Fremont, Calif., to be able to share information."

"We think that's going to be one of the big benefits of the Andrew File System — that it will enable closer collaboration within a company, when these groups are geographically disparate," Spector claims.

As for the Andrew File System, he is reluctant to declare that its protocol will become a networking industry standard.

"I can't predict that our technology will become a standard, but I can say, as a scientist, that the caching, the security and protocol ideas in the Andrew File System will be the basis of file systems in the future," Spector claims. "I'm confident of that."

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TECH TALK

High-speed I/O chase: EISA bus provides AT alternative

By T. J. West

Personal computer connectivity remains to date one of the demanding puzzles for MIS managers. Now with a new computer standard, the Extended Industry Standard Architecture (EISA), the puzzle just got either simpler or much harder, depending on whom you ask.

It used to be that PC connectivity was a relatively simple thing for MIS managers, that is, in the sense that it didn't happen at all. PCs were stand-alone ASCII boxes that could not talk to mainframes. At the very most, they might run a terminal emulation program.

That situation began to change with the advent of enterprise-wide networks and new groups of activist end users who demanded access to central data storage, usually without caring much about the results.

(This state of affairs has gotten particularly sticky in recent years. Mainframe storage used to be neutral in nature,

with IBM's IMS being one of the better examples of the kind of data storage that used to be the norm (IBM mainframes).

Then along came the relational revolution, and IBM introduced the relational DB2 database for its systems. Where IMS is difficult to access from PC-based systems, DB2 is open. It's based on well-known standards, such as SQL. Furthermore, dozens of other database management system products can talk to it without much trouble. This setup has opened up the grim possibility of end users romping happily — and without much concern for security — through important files.)

MIS thought it had found salvation when IBM unveiled its Personal System/2 line. Prior to the PS/2 introduction, these desktop and desktop units were rumored to have extensive mainframe connectivity features built directly into them. There were wild and heady dreams of PS/2s connecting to

Mike is a Boston-based writer specializing in up-and-coming technologies.

mainframes with as little trouble as one might encounter in connecting a phone to a private branch exchange. This link would happen via some magic software in IBM's OS/2, with end-user demands presenting little danger to mainframe files as wrong numbers present to a central phone directory.

Those dreams may eventually come true. But is some ways, the PS/2 hasn't even approached to MVS. Days in the development of OS/2 Extended Edition, the operating system in which the connectivity features are going to be more robust, reliable, and delays in the Microsoft Windows-based interface have slowed acceptance of the PS/2. For more damage, though, are the incompatibilities between the Personal Computer line and the PS/2.

In particular, the PS/2's bus, the Micro Channel, has been a problem because of, not in spite of, the fact that it's a very slick piece of work. As a technology, the Micro Channel is a significant offering. A sleek 32-bit bus, it has a very high capacity to support multiple processors and devices. It was expected, almost by itself, to solve MIS' connectivity problems because it could support multiple I/O and communication processors.

The architecture's drawbacks have been in marketing and politics. While the Micro Channel is good, it is hard to convince end users for small business customers. IBM has good reasons for making it this way. The company has seen its PC business attain sly by inexpensive clones and, this time, wants some kind of account control. But in the process of gaining that control, it has delayed the entry into the market of the board vendors that eventually make any bus legitimate.

Worse news for IBM, though, comes from end users. They are unhappy with the bus. While they agree they like the concepts it embodies, they also confess that it does not support their existing investments in Personal Computer AT boards. If they go with the PS/2, they might have to junk dozens of applications that they have developed and are about to develop.

Continued on page 35

PRODUCT CLOSE-UP: COMMUNICATIONS TOOLS

DEC fortifies IBM ties

The road between DEC and IBM continues to get smoother and faster. In a series of product announcements late in August, Digital Equipment Corp. reemphasized its commitment to enterprise-wide networking in general and improved its connections to IBM machines in particular. The offerings, which include new and enhanced hardware and software, are compatible with existing equipment and applications from both DEC and IBM, according to Michael Gaynor, IBM interconnect manager at DEC.

The key piece of hardware is an Ethernet communications server called the DEC MicroServer. Based on the 32-bit chip used in the company's Microvax II, it reportedly provides four times the speed of DEC's current synchronous server. The

device sells for \$12,000.

Running on this processor is a host of communications programs, particularly for DEC users wanting to tie into IBM's Systems Network Architecture (SNA). They let users on one system access files on another system transparently.

At the low end of the rollout is an enhanced version of DEC's VMS/SNA software. It provides a single, low-speed link between a VMS system and an SNA network at a rate of 64K bits/sec., compared with the older version's 19.2K bits/sec. rate. Prices range from \$430 for a DEC VAXstation II to \$17,290 for a DEC VAX 8840.

In the mid-range, DEC unveiled the network-to-network

Continued on page 39

BLUE
BEAT

Peer pressure

Brian Jeffery



Peer to peer. Sounds good, doesn't it? It brings up images of decentralized computing, networks without management and distributed processing.

IBM, we are told, is implementing a peer-to-peer network architecture under its Systems Network Architecture (SNA) using LU6.2 and such things as Advanced Program-to-Program Networking (APPN). But IBM is doing no such thing.

The first thing that needs to be clarified is LU6.2. This SNA protocol is marketed as Advanced Program-to-Program Communications (APPC). LU6.2/APPC merely establishes a basic interface through which programs may communicate on a peer-to-peer basis. The approach is different from a genuine peer-to-peer network envi-

ronment, which depends not on the vehicle for program-to-program communication but on the programming themselves and the underlying systems. It is thus feasible for an LU6.2 "peer-to-peer" network to support a fundamentally hierarchical systems architecture.

The trick to doing this is to ensure that the underlying systems environments are equipped with unequal capability. This is what IBM is doing, as seen in the following examples:

- IBM's relational database management system scenario is radically unequal. The central component is the DB2 environment, which runs only under MVS, which is optimized only by MVS/ESA, which is supported only for mainframes.

To reinforce this setup,

Continued on page 39

PRODUCTS

IBM beefs up Netview

But release won't be out until mid-'89

IBM is trying to make it easier to manage its large-systems networks. A late-September announcement included more than a dozen new or enhanced networking and network management software products. The problem for eager users, however, is that introduction dates for many of the offerings are spread throughout 1989.

Topping the list is a new release of IBM Netview, the company's main product for managing large networks. A major thrust of Release 3, which is upwardly compatible with earlier

versions, is to give users automation capabilities that they didn't have with previous releases. Netview command lists, for example, can now be written in an improved Rexx, a procedural language that is IBM Systems Application Architecture compatible. This feature is important, explained Kathryn Kornostoff, senior marketing analyst at Framingham, Mass.-based International Data Corp., because writing command lists is a highly labor-intensive job, sometimes requiring up to two full-time programmers. Rexx should make

that job easier, she said.

A key feature of Release 3 is its support of PL/I and C for programming command procedures and user exits, IBM said. Together with IBM's Knowledge tool, which the company calls an expert system, offering these high-level languages lets users incorporate into an automated system the experience of network operators and managers.

Release 3 reportedly can also aid centralized management of distributed systems by forwarding messages from remote systems to the controlling host. That feature puts them all in one place for the Netview operator. For IBM MVS/Extended Architecture networks, the release is scheduled for May 1989, at prices ranging from \$39,450 to \$81,600, depending on the size

of the processors. There is also a monthly charge of \$1,315. For IBM VM systems, the release is scheduled to be sold in August 1989 for \$9,470 to \$48,890, with a monthly fee of \$967.

IBM announced that Netview, which will be available in November, will be available for OS/2 Extended Edition machines come next May. Up to now, Netview has been available only for Microsoft Corp.'s MS-DOS systems. Netview/PC Version 1.2 will cost \$3,000. Version 2.0 of IBM's LAN Manager will let network managers control a remote IBM local-area network from a central Netview console. The LAN product, priced at \$2,995 and scheduled for delivery in March 1989, requires Release 3 of Netview. — MARK BREBART

Circle Reader Service Number 141

Modem motto: Faster speeds for less money

Resching out and touching someone is getting faster and cheaper, at least if you're a computer.

With its T1000, Teletel Corp. has unveiled a 9.6K bit/sec. dial-up modem for \$795. In addition to the price, Teletel said two features set the T1000 apart from the competition. One is throughput. The Mountain View, Calif., company claimed its modem will achieve a speed of 9.6K bit/sec. for any kind of file — text, graphics, binary, compressed or uncaptured.

With a proprietary process, Teletel claims that speed over phone lines by using more of the telephone bandwidth, stepping down in increments as small as 100 bit/sec., and by not relying on data compression.

Max search

Equally important for users trying to map and match modems, computers and software packages is Teletel's promise of compatibility. The T1000 works for micro, local-area networks and mainframes; it handles communications protocols like Kermit, Xmodem, Ymodem, Unix UUCP and IBM's Synchronous Data Link Control; and it supports the Hayes Microcomputer Products, Inc. V series command set.

By adjusting its speed automatically, it can also talk to slower modems already installed by a customer, the company said. For speeds of 9.6K bit/sec. and above, however, the T1000 can talk only to other modems using its proprietary process. The key to the modem's range of features is its Motorola, Inc. 68000 microprocessor, along with 50,000 lines of software programming. The modem is available only as

an external stand-alone unit.

For Data Race, Inc., the strategy is one-stop shopping as well as price. Its Mastermodem and optional software for personal computers can handle asynchronous operations, synchronous connections to IBM hosts and CCITT Group III facsimile transmissions. By lumping several capabilities into one box, the San Antonio, Texas, company said it hopes to free up users' ports and phone lines and to save them by buying one modem for each function. The Mastermodem comes as an internal card (\$995) for PCs or racks and as an external package (\$1,345).

Like the Teletel offering, Mastermodem uses industry-standard protocols for its asynchronous communications from 300 bit/sec. to 2,400 bit/sec., automatically adjusting to the speed. For interactive communications, it uses a patented serial full-duplex process licensed to other modem vendors. For file transfers, it uses a half-duplex "ping-pong" process that can reach speeds of up to 19.2K bit/sec. with data compression.

The synchronous features, through the PC's asynchronous RS-232 port, rely on two licensed products, the Hayes Synchronous Interface and Hayes Synchronous Driver. With its own software, the Mastermodem reportedly can emulate several IBM terminals, including the 5250, 3270, 3770/SNA, and 3780/EU. Prices for those programs range from \$200 to \$695, depending on the capabilities. The fax connection requires additional software, which is priced at \$295. — MARK BREBART

Circle Reader Service Number 142

CALENDAR

Nov. 6-12

Tech Connect Boston: The Independent Wiring Trade Show, Boston, Nov. 6-12. — Contact: Tech Connect Boston, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

Local-Area and PC Networks: Boston, Nov. 10-11. — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Nov. 13-19

Network Management, Control & Problem Determination: New York, Nov. 14-16. — Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

15th Annual Computer Security Conference: Miami Beach, Fla., Nov. 14-16. — Contact: Computer Security Institute, 366 Church St., Northboro, Mass. 01532.

The Software Re-Engineering Symposium: New York, Nov. 14-16. — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Strategies for Implementing Distributed Processing: Washington, D.C., Nov. 14-16. — Contact: IDC Washington Suite 1180, 8000 Tower Crescent Drive, Vienna, Va. 22180.

Experts on Networks: Atlanta, Nov. 14-17. — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Comdex/Fall '88: Las Vegas, Nev. Nov. 14-18. — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

COMPUTERWORLD

Tech Talk

Continued from page 27

but that require special hardware.

The irony of the situation is that by introducing the AT bus from somewhere, IBM took away from its low-end machines what had become standard in much larger ones from other vendors. Many vendors now follow a dual strategy in which their machines have one high-speed bus and a second, PC AT bus so users can easily port PC-based applications to them.

Apollo workstations, for instance, now come as well as Apollo's own 32-bit bus. The Sun 386i workstation has an AT bus as well. Even microsupercomputer vendor Stellar Computers puts an AT bus in its machines.

No surprises here

And thus, it shouldn't have been a surprise when, this fall, IBM reintroduced an AT bus machine at the lower end of the PS/2 line.

Another surprise that shouldn't have been is EISA. In September, a group of PC-AT-compatible makers announced that it was racing to the PS/2 by creating its own standard for personal computers.

AST Research, Compaq Computer, Epson America, Hewlett-Packard, NEC Information Center Systems, Olivetti, Tandy, Wyse Technology and Zenith Data Systems announced that they had developed a generic desktop design to which they would adhere. Each will put its own improvements on top, but otherwise, the vendors swear to be faithful to EISA.

Part of EISA's design is the EISA bus. It is being advertised as everything the Micro Channel was supposed to be but isn't.

In fact, it is part of what the EISA technical synopsis describes as a "bus subsystem," which, among other things, provides "high-speed data channels for interconnecting high-performance I/O peripherals, such as disk and LAN controllers." Note in particular the reference to local-area networks.

Unlike the Micro Channel, though, a fixture for EISA can be had quickly and easily. For \$2,500, you, too, could be an EISA licensee.

In short, the EISA specification looks like it could be a real challenge to IBM on the connectivity front.

If EISA machines, rather than the PS/2, can first offer consumers a safe, convenient way to give executives access to shared frames but protect mainframe data in the process, then it could be a significant design indeed.

PRODUCTS

Blue Beat

Continued from page 37

IBM's premier environment for managing large direct-access storage device volumes is the Data Facility Storage Management Subsystem, which is again supported for MVS mainframes.

Given this kind of structure, it could be expected that data would automatically migrate to central site hosts; to encourage the process, there is IBM's Server-Requester Program interface, a central OS/2 Extended Edition component. Workstations request hosts serve.

Network management is top down. The most obvious component of IBM's network management scenario is IBM's NetView, which is easy to think of as NetView's only component. The scenario, however, also includes a distinct environment that includes NetView Distribution Manager along with Distributed Systems Executive (DSEX) and VM Distributed Systems Node Executive (DSNX). This is interesting software that implements a capability to distribute software and microcode throughout an SNA network.

This distribution complex could easily be developed into a

capability for dynamic reconfiguration: Load at host level and download to mid-range systems, workstations, cluster controllers and the like. This could provide long-overdue flexibility for SNA network reconfiguration.

APPN is being incorporated into this scenario, which is a pity. APPN is an environment that could create genuinely decentralized and dynamic reconfiguration in an SNA network.

IBM, however, has chosen to treat APPN as a means of providing subfunctions, such as directory services, within the network. To date, these services are supported solely in the System/36 and 38 environments.

APPN as implemented for the AS/400, for example, is subsumed into Electronic Customer Support, which complements the built-in top-down architecture as does DSX and DSNX.

The bottom line is that IBM's network architecture is still very much top-down and that it will probably never be feasible to build a nonmainframe SNA network.

The host mainframe will prove increasingly indispensable. So what is LU6.2 all about? Not peer-to-peer networking. It is coprocessing. LU6.2 establishes an infrastructure that makes it possible for multiple

systems to process the same application simultaneously. Thus, a PS/2 and a mainframe might coprocess an application with the interface component residing in the PS/2 and the data management component residing in the mainframe. Mechanisms built into OS/2 Extended Edition would transfer upstream, say, 90% of the total task of processing the application. Similarly, mechanisms built into a 9370 or AS/400 would transfer upstream, say, 50% of the total processing task to a central MVS mainframe.

One might consider this a form of peer-to-peer networking, but somehow it doesn't quite catch the flavor of the whole thing. It's like saying that mainframes become "servers for PCs." That sounds good. Equally, however, one can say that "PCs become intelligent input devices for mainframes." Sounds different, doesn't it?

I may be wrong. Perhaps IBM really will implement a network architecture that doesn't require a mainframe. If you believe that, I also have a bridge for sale.

Jeffery is managing director of the International Technology Group, a management consulting and market research firm in Los Altos, Calif.

Gateway ST costs \$20,500.

At the high end is a package that links a Decnet directly to an IBM 370 communications channel. Supporting up to 255 users, the Decnet/SNA Gateway for Channeled Transport costs \$44,500. It uses a different server, the DEC Channelserver.

Sitting on top of this software is a package to handle file trans-

fers between the networks. The Decnet/SNA Data Transfer Facility (DTF) can handle Microsoft Corp. MS-DOS and DEC UTRIX systems as well as DEC's VMS. The price of the DTF ranges from \$2,100 to \$21,000, depending on the hardware involved. As an IBM host, it costs \$21,000. — MARK BREBART

Circle Reader Service Number 143

DEC fortifies

Continued from page 37

Decnet/SNA Gateway for Synchronous Transport. Able to handle up to 128 concurrent sessions at up to 256K bps/sec., the Gateway-ST improves on the existing gateway that allows up to 32 users at 64K bps/sec. The

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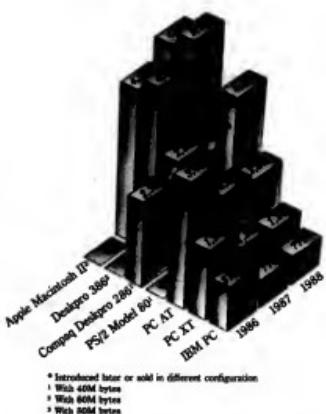
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INFORMATION GARNERED FROM THE BOSTON COMPUTER EXCHANGE CORP.'S DATABASE OF CLOSING PRICES OF USED MICROPS IN AUGUST 1984.

GRAPHIC BY BRUCE SANDERS

OF INTEREST

The industry is so young and volatile that it may be more vulnerable to political issues."

JOSEPH COLLINS
DPMA PUBLIC AFFAIRS

See story page 27

next issue

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Connectivity knocks

Michael D. Millikin

Personal computer connectivity has become synonymous with "good news." Finding a vendor willing to remove such PC support is about as easy as finding a presidential candidate willing to knock motherhood.

But PCs have undergone tremendous evolution during the past few years and, thereby, have laid the ground for an explosion of different interpretations about what PC connectivity means.

At the low end, connectivity means running a wheezy 8-bit Intel 8088 machine as a terminal to a host. In fact, there are now dedicated terminals that pack more processing power than the original PC. (IBM's latest generation of the 3270 family boasts an Intel 80186 CPU, on-board random-access memory and a 3½-in. floppy for downloading microcode.) At the high end, we have 32-bit Intel 80386 powerhouses that can operate as fully functional nodes in a distributed network computing environment with full cooperative processing in a client-server model.

About the only thing those two types of machines have in common is that they can run the same operating system and applications.

But clearly, connecting the 80386 to run as a speedier Intel 8088 is not good utilization of technology. A variety of solutions are sprouting up to exploit the hardware. We can run the 8-bit-based PCs as Unix machines. We can run them as OS/2 machines in an OS/2 network. IBM will eventually run them as OS/2 Extended Edition machines in its Systems Application Architecture network. We can endow them with graphics user interfaces similar to the Apple Macintosh.

The arrival of more powerful technology has smashed any conception of a monolithic PC world bit to bit. Complicating things even further is the growing awareness of the need to provide users with a transparent point of access to heterogeneous systems linked together — a common applications environment within a distributed network architecture, if you will.

Only some PCs can play a role in such a configuration. Unfortunately, on the PC-DOS/OS/2 side of the house, the pieces that enable such a solution still aren't fully in place, although the application library may be well stocked. On the proprietary side, the communications, networking and consistent interfaces are in place, but the same wealth of applications might not exist. Truly a dilemma for users trying to do systems planning.

Until OS/2 matures a bit and has a well-stocked application library, there is an opportunity for vendors that can walk in with a workstation that does some advanced processing, optimization and networking as well as offer a rich set of PC-style applications. The two likeliest operating system platforms for such a workstation are Unix and DEC VMS. The essential ingredient for success will be for vendors to entice PC independent software vendors to program for their platforms.

Millikin is vice-president and senior analyst with Patricia Seybold's Office Computing Group in Boston.



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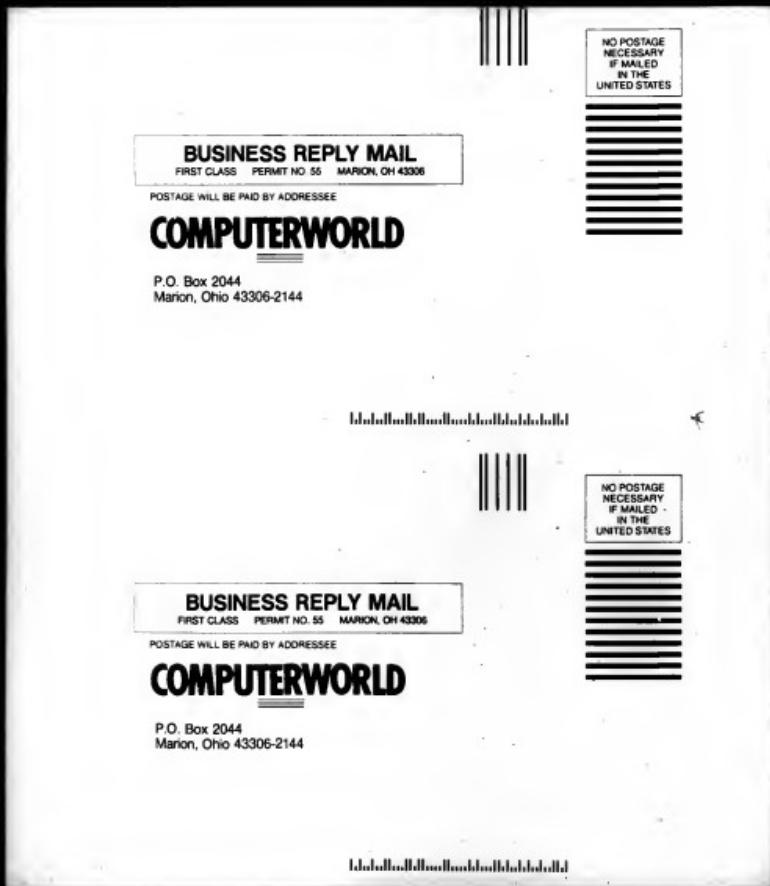
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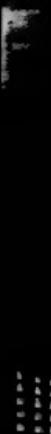
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